

# THE GENUS CYBIANTHUS (MYRSINACEAE) IN ECUADOR AND PERU

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## ABSTRACT

The genus *Cybianthus* was revised to provide taxonomic treatments of the Myrsinaceae for *Flora of Peru*, *Catalogue of the Vascular Plants of Ecuador*, and *Flora of Ecuador*. Eight of *Cybianthus'* ten subgenera are represented, and an updated description of the genus, keys to its subgenera and emended descriptions for each are provided. Detailed descriptions of the morphology, anatomy and ecology of the genus are presented. *Cybianthus* subgenus *Iteoides* is relegated to synonymy under subgenus *Microconomorpha*. Within each subgenus, keys, full descriptions, synonymy, distribution, ecology and conservation statuses, local names and uses are given for each species. In addition, specimens are cited for each species, including extralimital ones to show extremes in morphological variation. Thirteen species are relegated to synonymy, nine names are lectotypified, and one, *Conomorpha rigida*, is neotypified. One new combination, *Cybianthus guyanensis* subsp. *pseudoicacorensis*, is made, and *Cybianthus poeppigii* is transferred from subgenus *Cybianthus* to subgenus *Weigelia*. The following 15 new species are described, illustrated and their phylogenetic relationships are discussed: *Cybianthus anthuriophyllus*, *C. ceneensis*, *C. comperuvianus*, *C. croatii*, *C. flavovirens*, *C. fosteri*, *C. grandezi*, *C. granulosus*, *C. huampamiensis*, *C. incognitus*, *C. jesonii*, *C. nestorii*, *C. pseudolongifolius*, *C. timanae*, *C. vasquezii*.

## RESUMEN

Al preparar tratamientos taxonómicos sobre la familia Myrsinaceae para los proyectos *Flora del Perú*, *Catálogo de las Plantas Vasculares del Ecuador*, y *Flora del Ecuador*, se llevó a cabo una revisión del género *Cybianthus*. Se encuentra en la región ocho de los diez subgéneros, y se proveen tanto una descripción actualizada para el género como para cada subgénero también. Se presentan descripciones detalladas tratando la morfología, anatomía y ecología del género. Se relega *Cybianthus* subgénero *Iteoides* a la sinonimia bajo subgénero *Microconomorpha*, y se transfiere *Cybianthus poeppigii* del subgénero *Cybianthus* al subgénero *Weigelia*. Para cada subgénero, se proveen claves, descripciones completas, sinonimia, distribución geográfica y estado actual de su conservación, nombres locales y usos. También se cita colecciones revisadas para cada especie, incluyendo ellas fuera de la región delimitada cuando se muestran variación morfológica significativa. Se relegan 13 especies a la sinonimia, se lectotipifica 9 binomiales y uno, *Conomorpha rigida*, se neotipifica. Se publica la nueva combinación, *Cybianthus guyanensis* subsp. *pseudoicacorensis*. Se describen, se ilustran y se discuten el parentezco para 15 especies nuevas, listadas a continuación: *Cybianthus anthuriophyllus*, *C. ceneensis*, *C. comperuvianus*, *C. croatii*, *C. flavovirens*, *C. fosteri*, *C. grandezi*, *C. granulosus*, *C. huampamiensis*, *C. incognitus*, *C. jesonii*, *C. nestorii*, *C. pseudolongifolius*, *C. timanae*, *C. vasquezii*.

## INTRODUCTION

The genus *Cybianthus* Martius was cladistically defined by the presence of unique glandular granules at the junction of the corolla tube and lobes by Pipoly (1987). In addition, the unique combination of lateral (axillary) inflorescences, gamosepalous and gamopetalous flowers, and stamens connate by their filaments at least one-fourth their length, and adnate to the corolla tube at least one-third its length (Pipoly 1987, 1992a) allows for practical recognition from herbarium specimens. With this contribution, *Cybianthus* now contains 167 species in ten subgenera. The genus includes species formerly included in the genera *Comomysine* Hook. f., *Conomorpha* A. DC., *Correlliana* D'Arcy, *Cybianthopsis* Lundell, *Grammadenia* Benth., *Microcomomorpha* Lundell, and *Weigeltia* A. DC. (Pipoly 1987, 1992a). In Ecuador and Peru, 43 species in 8 subgenera are known. Among the species, none are endemic to Ecuador, while 11 are endemic to Peru.

The broad generic concept for *Cybianthus* was first proposed by Agostini (1970) as a precursor to his dissertation (1972); that was followed by the formal transfers and a key to the subgenera (Agostini 1980). Subsequently, while revising subgenus *Grammadenia*, Pipoly (1987) determined that the paleotropical genus *Embelia* Burman f. was the sister group to the entire genus and that it was most parsimonious to include *Grammadenia* within *Cybianthus*. Preparation of taxonomic treatments for the Myrsinaceae in *Flora of Peru*, *Catalogue of the Vascular Plants of Ecuador* and *Flora of Ecuador* revealed that many taxa were new, and much confusion had arisen among the concepts prevalent for taxa already described. Among adjacent countries with significant Amazonian regions, Ecuador and Peru share more species of *Cybianthus* in common than do any other pair of countries. While it would have been desirable to include Colombia to provide a treatment for the entire northwestern South America, the number of additional species endemic to Colombia, or known only from Colombia and Venezuela, would have increased the size of the treatment by fifty percent. Given that it will be some time until a revision of the entire genus for *Flora Neotropica* is complete, the present treatment is intended to serve as a precursor to that monograph and to make the names available for the other aforementioned projects. A revised description of the genus *Cybianthus* follows, including keys and emended descriptions for the eight subgenera occurring in Ecuador and Peru, along with keys to the taxa and full descriptions for each. For each of the fifteen new species described, illustrations are provided, while for all species, full descriptions and synonymy, discussions of distribution, ecology and conservation status, etymology, and when known, local names and uses are elucidated.

## MORPHOLOGY

Morphological terms in this treatment follow Lindley (1848) and Pipoly

(1987, 1992a) for the inflorescence, rachis pedicels and floral parts. Description of leaf morphology follows Hickey (1984), trichome description follows Theobald et al. (1984) and basic cell and tissue terminology follow Metcalfe (1984).

### Habit and Architecture

The majority of *Cybianthus* species in Ecuador and Peru are large shrubs or small trees to 18 meters tall. Four species are small shrubs or subshrubs (*Cybianthus croatii*, *C. humilis*, *C. lineatus*, *C. nanayensis*) usually under one meter tall. With the exception of two species in subgenus *Grammadenia*, all species are terrestrial. *Cybianthus marginatus* is an obligate epiphyte, while *C. magnus* is a facultative epiphyte, frequently found on large tree trunks, but also known from large rock outcrops.

Most members of *Cybianthus* exhibit Rauh's Model of architecture (Hallé et al. 1978), characterized by a polyaxial, monopodial, rhythmically growing, readily distinguishable trunk, that develops tiers of branches morphogenetically identical to itself. All branches are orthotropic and monopodial, with lateral (axillary) inflorescences that do not affect shoot development. However, two subgenera (*Comomysine* and *Triadophora*) exhibit Corner's Model (Hallé et al. 1978), characterized by a single aerial meristem that produces a monoaxial (unbranched) axis on which inflorescences are lateral (axillary). The resulting monocaulous tree is pleionanthic (not hapaxanthic, or monocarpic) and growth is indeterminate. The trunk may grow rhythmically or continuously. Sporadic occurrences of this architectural model occur in members of subgenus *Weigeltia*, from the Guianas and eastern Amazonia, however, none of those species are known from Ecuador and Peru.

While conducting fieldwork in Peru, a collection of *Cybianthus kayapii* (Lundell) Pipoly was observed reiterating. In the population observed at Explorama Lodge near Yanamono, (Loreto, Peru) one individual (Pipoly et al. 12383), exhibited bayonet reiteration, caused by destruction of the apical meristem of the trunk. The individual bore a reduced staminate inflorescence with flowers slightly larger and more maroon in color than normal, and smaller leaves with shorter petioles. As I have noted elsewhere (Pipoly 1987, 1992a), leaves on the reiterative shoots resemble those of saplings. Variation in inflorescence and floral morphology seen in this Peruvian population is consistent with variation reported in Pipoly (1992a). Therefore, it appears that changes in sex expression are consequent to a reiteration phenomenon, rather than circumstantially associated with it. I postulate that reiterative branches may be hormonally juvenile and as such, are morphogenetically incapable of producing bisexual or pistillate flowers, and produce only sapling leaves until flowering occurs. This process may account for the great variation in leaf morphology and apparent sexual lability often associated with many species of *Cybianthus*. Unfortunately, for individuals of normally dioecious species with monoaxial

models, it is not possible to determine if sex change has occurred because no inflorescences are usually observed before the original apical meristem is destroyed, and no inflorescences on other branches are available for comparison. However, precociously flowering individuals of *Cybianthus incognitus* (*P. Barbour* 2405) support the hypothesis. Clearly, pruning experiments *in situ* will be necessary to test this hypothesis.

### Branchlets

A branchlet is here defined as the distal 10 cm of any branch. Branchlets may be flexuous, or straight; terete or angular; smooth, verruculose, or verrucose-papillate (Fig. 1A, 1B), glabrous, glandular-papillate (Figs. 1D, 3E, 4F), ferrugineous stipitate-lepidote (Fig. 2A–F), ferrugineous or rufous dendroid-and/or stellate-tomentose (Fig. 3A), rufous sessile furfuraceous lepidote, with a tomentum of malpighiaceous trichomes (Fig. 3D), glandular-granulose, with hydropotes (Fig. 3C), epunctate or rubiginous punctate-lineate, bearing lenticels or not.

### Leaves

Species of *Cybianthus*, like all Myrsinaceae, are exstipulate and have simple leaves. The leaves are usually alternate, but may be subopposite or pseudoverticillate, especially in subgenera *Microcomorpha*, *Comomysine*, *Weigeltia* and *Cybianthus*. In the majority of species, the leaves are petiolate, but in subgenus *Grammadenia* they are sessile. The ptyxis (the form in which one single leaf is folded on itself in bud) is most often supervolute (Cullen 1978), but it has not been adequately studied thus far for each subgenus. The leaf vernation sensu Cullen (1978), is at least analogous with floral aestivation, or the relationship of one leaf to another; in *Cybianthus*, it is in fact, unknown. The leaf blade texture may be membranaceous, charraceous or coriaceous. The shape is most often elliptic, but may be oblanceolate, lanceolate, obovate, rarely ovate or oblong (*Cybianthus marginatus*). The apex may be acute, acuminate, long-attenuate, rounded, obtuse, or emarginate, without mucro or rarely (subgenera *Grammadenia*, *Comomysine*, *Triadophora*) mucronate (Fig. 21). The base is rarely auriculate (subgenus *Grammadenia*) or obtuse approaching auriculate (*Cybianthus grandezi*, *C. kayapii*, *C. anthuriophyllus*) and is usually cuneate, long-attenuate, acute or obtuse, decurrent on the petiole or not. The adaxial surface may be nitid, pallid, or sordid, rarely scrobiculate, pusticulate or pustulate when mature. The blade margin may be regular or irregular, flat inrolled or revolute, entire, or rarely undulate, lobate, crenate or dentate (*Cybianthus pastensis*), densely and minutely serrulate (*C. anthuriophyllus*), or coarsely dentate (*C. schlimii*, some populations of *C. pastensis*, *C. poeppigii*, ), or with a very subtle but vascularized vein ending (*C. verticilloides*) opaque, or rarely scarious (all species in

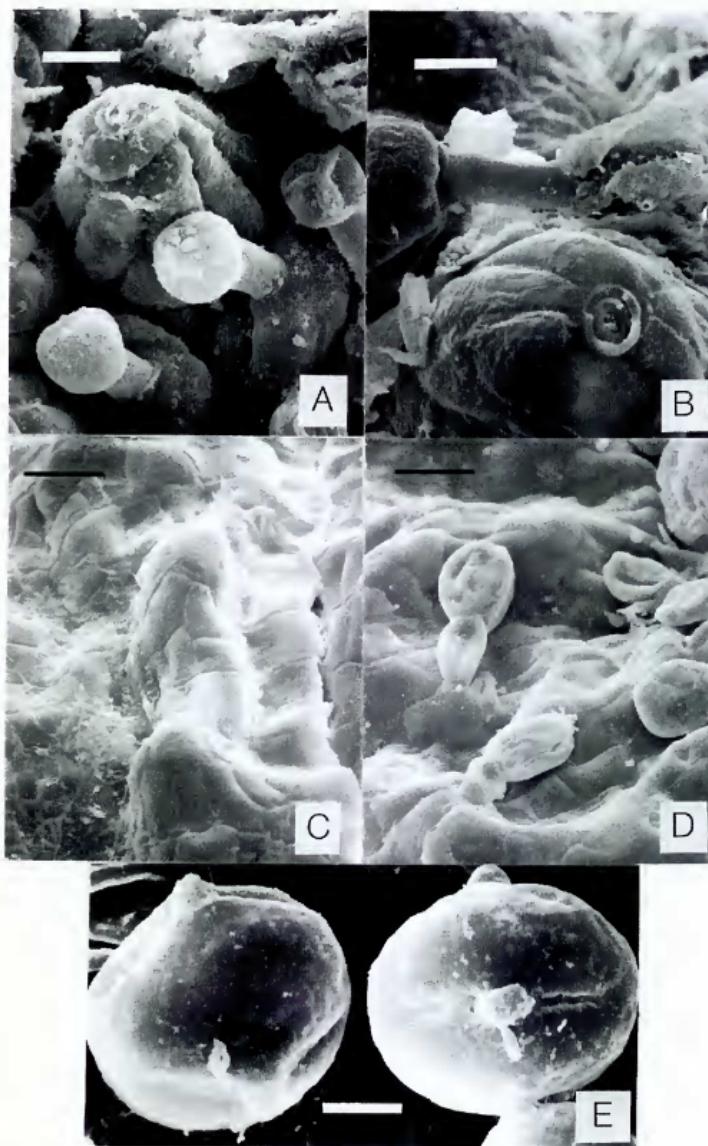


FIG. 1. SEM photos of morphological features in subgenus *Grammadenia*. A. *Cybianthus marginatus* (Pipoly 6546), showing verrucose papillae. B. Same, close-up. C, D. *C. lineatus* (Pipoly et al. 7729), showing stem surface. D. Glandular papillae. E. *C. costaricanus* subsp. *morii* (Pipoly 7017), pollen, equatorial and polar views. (Bars in figs. equal: A. 50 µm, B. 22.2 µm, C, D. 48 µm, E. 12.3 µm) Figure reproduced from Pipoly, 1987.

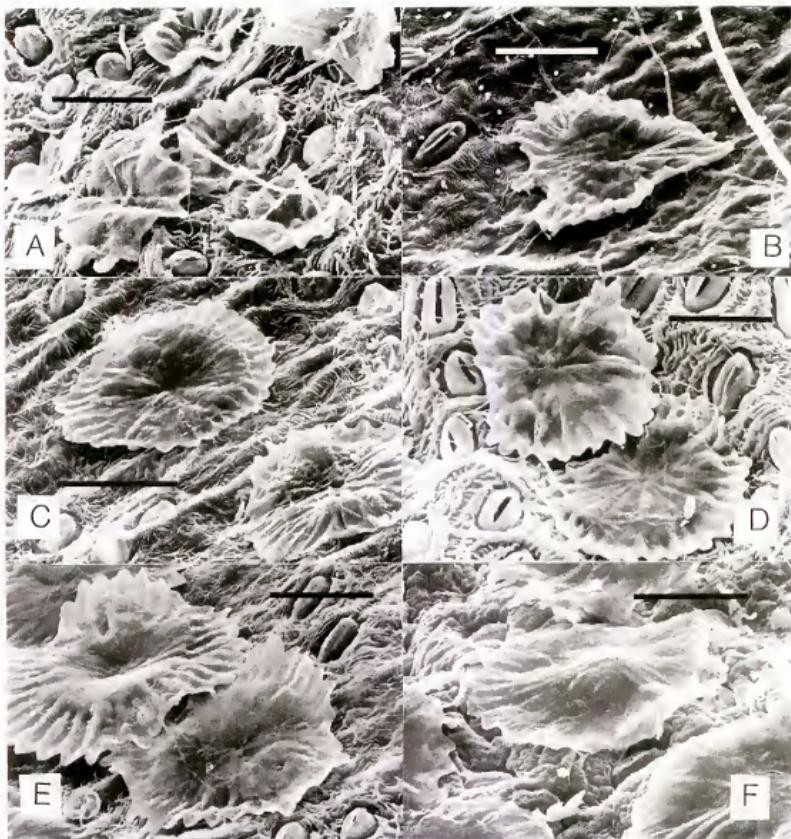


FIG. 2. SEM photos of representative stipitate ferruginous lepidote scales of subgenus *Comomorpha*. A. *Cybianthus gigantophyllus* (holotype). B. *C. spicigeri* (holotype). C. *C. laetus* (Dudley 10803). D. *C. peruvianus* (Dodson 2821). E. *C. comperuvianus* (Killip & Smith 26073). F. *C. guyanensis* subsp. *pseudoicaeum* (Simpson & Schunke 784). (Bars in Figs. A–F equal: 50 µm).

*Cybianthus* subgenus *Grammadenia*; *Cybianthus humilis*, and *C. croatii* of *Cybianthus* subgenus *Comomysine*.

Leaf punctuation and punctate-lineation may be pellucid (translucent), black, orange red, or rubiginous (light red) in color. Punctations as defined by Pipoly (1987) are definded as rounded, lyso-schizogenously formed cavities and are distinguished from punctate-lineations, which are homologous, linear cavities in the leaves. Among taxa bearing non-pellucid punctations or punctate-lineations, all young, undexpanded leaves have orange glands, even if mature leaves have red or black glands. Experiments to determine integrity of punctuation color have revealed that it is not a reliable taxonomic character

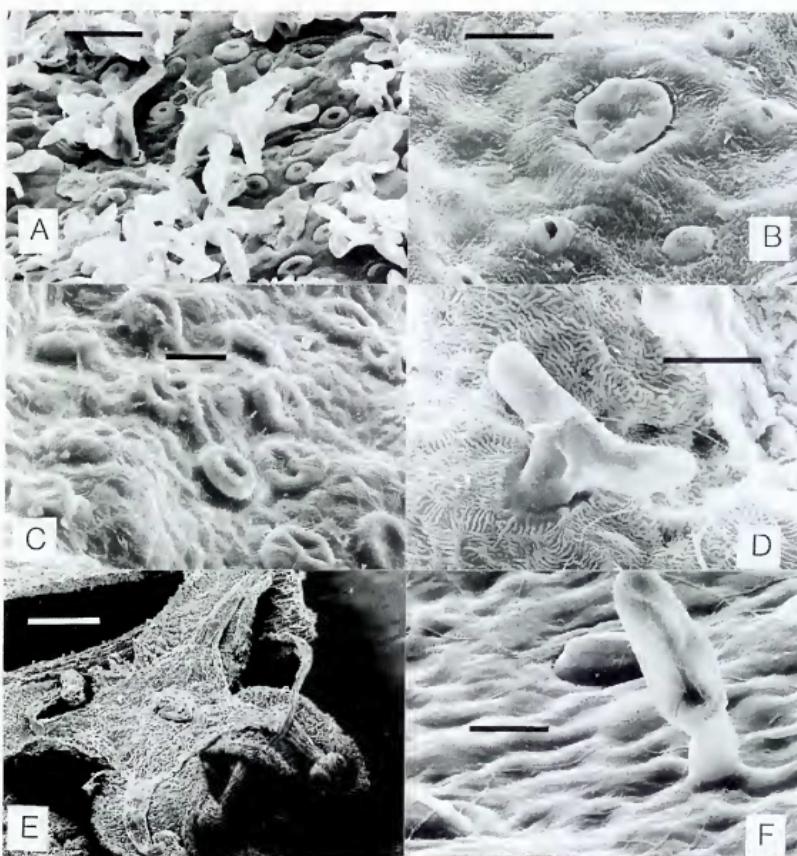


FIG. 3. SEM photos of representative vestiture in subgenera *Laxiflorus*, *Microconomorpha*, *Triadopbora* and *Comomysine*. A. *Cybianthus fulvopulverulentus* subsp. *magnoliifolius* (Cowan & Soderstrom 2146), branchlet, showing stellate trichomes. B. *C. spicatus* (Maguire & Politi 28064), showing hydropote in abaxial leaf pit. C. *C. pastensis* (Killip & García 33886), branchlet, showing developing hydropotes. D. *C. schlimii* (Fosberg 20148), branchlet, showing malpighiaceous trichome. E. *C. kayapii* (holotype) Staminate flower, showing vestigial pistillode, structure of androecium. F. *C. humilis* (Lehmann s.n.), showing glandular papillae of abaxial leaf surface. (Bars in Figs. equal: A–C. 50 µm, D & F. 25 µm, E. 0.4 mm).

(Pipoly 1987). The other punctuation character states include “conspicuous” versus “inconspicuous,” reflecting the ease of viewing the punctuation (a reflection of its relative diameter in transverse section), and “prominent” versus “not prominent,” which refer to whether the punctuation is blister-like or planar, respectively.

The abaxial and/or adaxial surface of the blade may be glabrous, or with

a vestiture composed of stipitate ferrugineous lepidote scales (subgenus *Comonomorpha*, Fig. 2A-2F), sessile furfuraceous lepidote scales (subgenus *Weigelia*), dendroid and/or stellate trichomes, translucent glandular-lepidote scales, or with scattered glandular papillae (subgenus *Comomysine*, Figs. 3F, 4F ), malpighiaceous trichomes (subgenus *Triadophora*, Fig. 3D), or hydropotes (subgenera *Laxiflorus*, *Microconomorpha*, *Grammadenia*, *Comomysine*, Figs. 3A, 3C, 4A-E ). The adaxial surface is usually glabrescent.

Hydropotes ("water drinkers") were previously thought to be unique to subgenus *Grammadenia* (Pipoly 1987), but have now been found in all species of subgenus *Comomysine*. Described by Mayr (1915) and Grüss (1927a, 1927b), hydropotes have been reported for numerous submerged aquatic angiosperms (Fahn 1979; Gessner & Volz 1951). Elegant ultrastructural and autoradiographic studies undertaken by Lützge (1964) and Lützge and Krapf (1972) demonstrated the mineral absorptive function of hydropotes. While both subgenera bear these structures, their morphology is strikingly different. The hydropotes of subgenus *Grammadenia* (Fig. 5) consist of five to seven subsidiary cells, a central foot cell, a basal cell, a stalk cell, and up to 12 cells forming a scale-like cap, while those of subgenus *Comomysine* consist of five to seven subsidiary cells, a central foot cell, a stalk cell, and up to 12 cells forming a lenticular cap or globose body. In subgenus *Comomysine*, the cap cell is formed before elongation of the stalk cell. In *Cybianthus verticilloides* (Fig. 4B), *C. sprucei* (Fig. 4D), and *C. kayapii* (Fig. 4E) the cap consists of a spherical body of cells, while in *C. croatii* (Fig. 4A) and *C. simplex* (Fig. 4C), the cap is lenticular. It is interesting to note that within subgenus *Grammadenia*, the shape of the cap is the same among all species, while in *Comomysine*, there are 4 types. The occurrence of hydropotes in subgenus *Laxiflorus*, in pits over the abaxial leaf surface, and in subgenus *Microconomorpha*, under the papillate tomentum of the branchlets, was unknown before the present study. Despite these differences, the structures are homologous, based on position, function and ontogeny. In early ontogeny, a mucilaginous substance accumulates around the base cell (Fig. 7E). Later, the cap breaks off (Fig. 7F), leaving a mucilaginous ring around the broken basal cell (Pipoly 1987, unpubl. data).

Subepidermal fibers, visible as numerous, thin, parallel lineate structures on both surfaces of leaf blades in subgenus *Triadophora* are unique to it. They have recently been shown to be homologous with those of *Clavija* in the Theophrastaceae (Pipoly, unpubl.).

Petioles are present in most taxa, with the notable exception of subgenus *Grammadenia*, where the leaves are sessile. The petioles may be canaliculate, marginate, or canaliculate with margins, trigonal, or rarely subterete, and may be pulvinate (abruptly swollen basally) or gradually tapering basipetally.

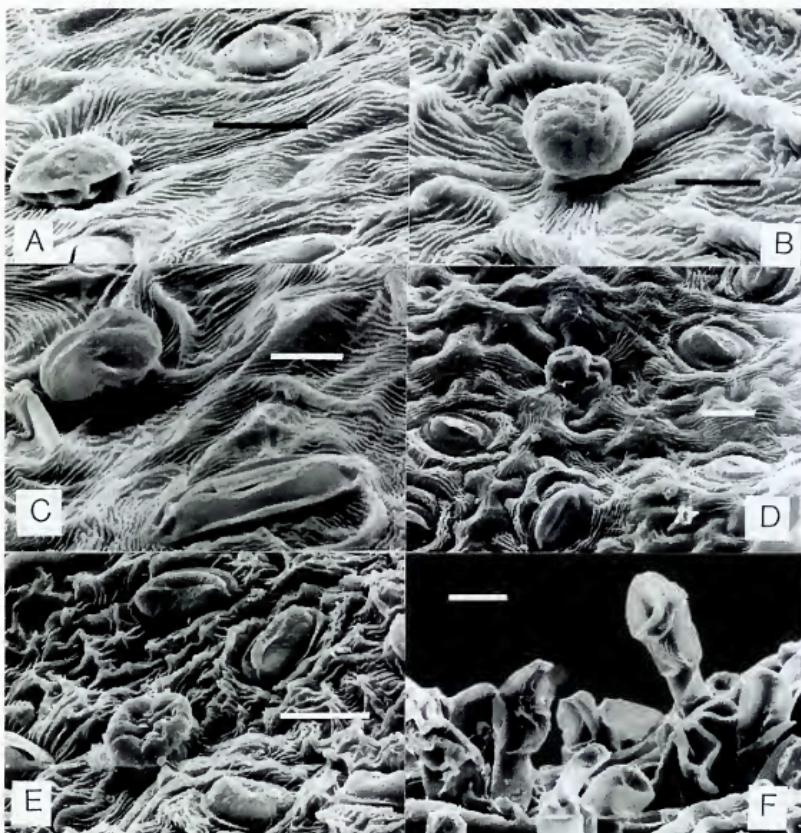


FIG. 4. Representative SEM photos of morphological features in subgenus *Comomysrine*. A–E, Hydropotes of abaxial leaf surface. A. *Cybianthus croatii* (holotype), showing lenticular cap. B. *C. verticilloides* (holotype), showing globose cap. C. *C. simplex* (Zak 1350), showing lenticular cap. D. *C. sprucei* (Cuatrecasas 15743), showing globose cap. E. *C. kayapii* (holotype), showing depressed-globose cap (somewhat collapsed). F. *C. kayapii* (holotype), branchlet, showing glandular papilla. (Bars in Figs. equal: A. 25 µm. B. 20 µm. C. 10 µm. D–F, 25 µm).

### Cataphylls and Pseudocataphylls

Cataphylls (Fig. 9B) and pseudocataphylls are synapomorphic to subgenera *Comomysrine* and *Triadophora*, respectively. Earlier (Pipoly 1987), I had mistakenly interpreted them as inflorescence bracts. They may be alternate or pseudoverticillate, alternating with pseudoverticels of leaves, or apparently axillary to them, rigid, chartaceous, or membranaceous, linear-subulate to

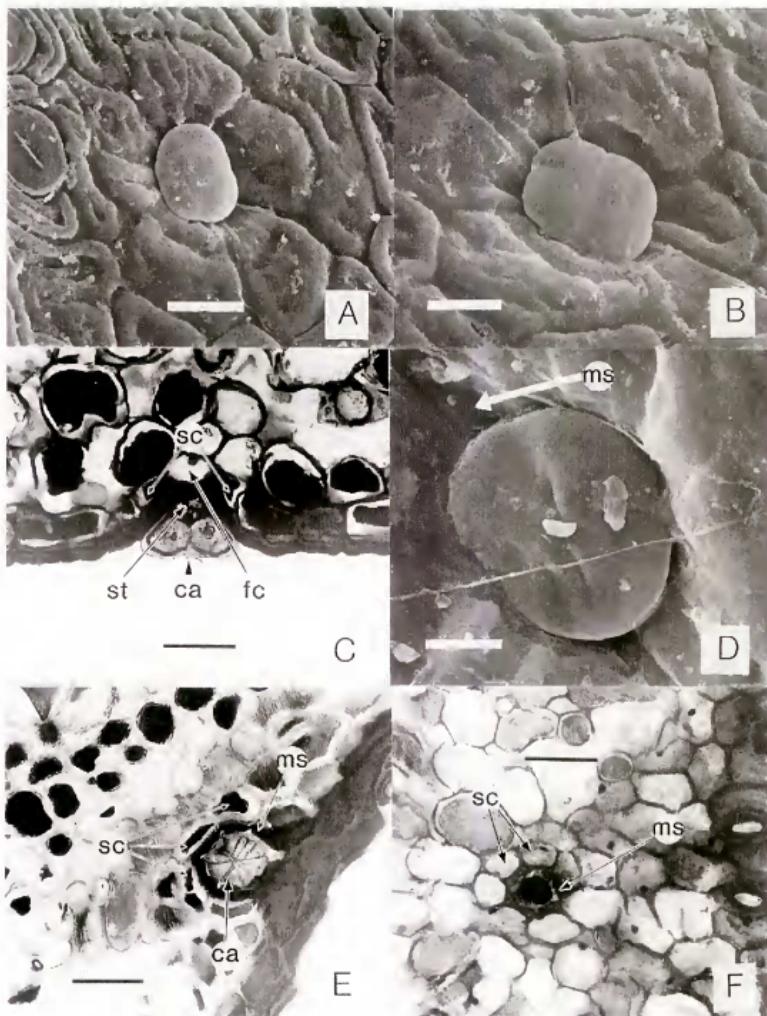


FIG. 5. Ontogeny of hydropotes in subgenus *Grammadenia*. A, B, & D. *Cybianthus costaricanus* subsp. *costaricanus* (Pipoly 7608), SEM photos. A. Mature hydropote, cap with at least 8 cells, and with 5 subsidiary cells. B. Younger hydropote, cap with 4 cells, and with 6 subsidiary cells. C. *C. costaricanus* subsp. *morii* (Pipoly 7017), longisection of young hydropore, showing subsidiary cells (sc), foot cell (fc), stalk cell (st), cap cell (ca), basal cell not discernible. D. Young hydropote, with 2-celled cap, showing mucilaginous substance (ms). E, F. *C. costaricanus* subsp. *panamensis* (Pipoly 7056), paradermal sections. E. Showing mature hydropote, with 12-celled-cap. F. Showing hydropote after cap has broken off. (Bars in Figs. A–F equal: A & C. 28 µm, B. 20 µm, D. 10 µm, E. 36 µm, F. 5.3 µm. Figure reproduced from Pipoly, 1987.)

acicular, rigid to membranous, keeled or flat, apically mucronate or not, prominently punctate or punctate-lineate, glabrous, rufous puberulent, glandular-papillate, bearing hydropotes, or orange lepidote scales, sessile or on a petiole to 2 mm long. Pending further developmental studies, I am distinguishing cataphylls from pseudocataphylls based on the absence of a petiole in the former and its presence in the latter. Within *Cybianthus*, pseudocataphylls are unique to subgenus *Triadophora*, while cataphylls are unique to subgenus *Comomysrine*. Both pseudocataphylls and cataphylls may be distinguished from an inflorescence bract by the fact that neither of these structures are axillant to an inflorescence, neither are ephemeral, but both occur in pseudowhorls.

### Inflorescence and Flowers

The inflorescence in *Cybianthus* is always lateral (axillary), and it may consist of a simple raceme (erect or lax), a subpyramidal or pyramidal panicle (sometimes thyrsoid), a spike, or rarely, a pleiochasium. At times, species with essentially racemose inflorescences may produce a panicle consisting of a pseudoverticel of racemes on a reduced peduncle. In this treatment, an inflorescence is considered spicate if the pedicels are obsolete or less than 0.3 mm long and subspicate if the pedicels are from 0.4–0.8 mm long. In most species, the staminate inflorescence tends to be longer, slightly more lax, and bears greater numbers of flowers. In those species bearing panicles, the staminate ones bear secondary branches of the inflorescence that are longer, more floriferous, and at times, more branched than the pistillate and bisexual panicles.

The inflorescence bracts are early caducous and are rarely seen in the field or on specimens. The secondary branch bracts of panicles are also rarely collected, with the exceptions of subgenera *Comomysrine* and *Triadophora*. The floral bracts may be membranaceous or chartaceous and are usually persistent in staminate inflorescences, but are at times caducous in pistillate ones. The floral bracts may be glabrous or bear a tomentum either adaxially, abaxially, or on both surfaces. The floral bract apices are acute, attenuate, or acicular, the margins entire or undulate.

The pedicels are cylindrical, clavate, or obconic, and at times accrescent or crassate in fruit. In most species, the pedicels are subtended by an axillant floral bract, but in *Cybianthus kayapii*, it is inserted at about the middle of the pedicel.

Figure 6 illustrates the tremendous variation in floral morphology among members of the genus, along with representative staminate and pistillate flowers from *Embelia*, the paleotropical sister genus of *Cybianthus*. The flowers may be functionally staminate, pistillate or bisexual. Consequently, the plants are normally functionally dioecious, but may also be bisexual or polygamous. Flowers are normally perfect, but in some species of subgenera *Weigelia*, *Comomysrine* and *Cybianthus*, the pistillode is often obsolete in the stami-

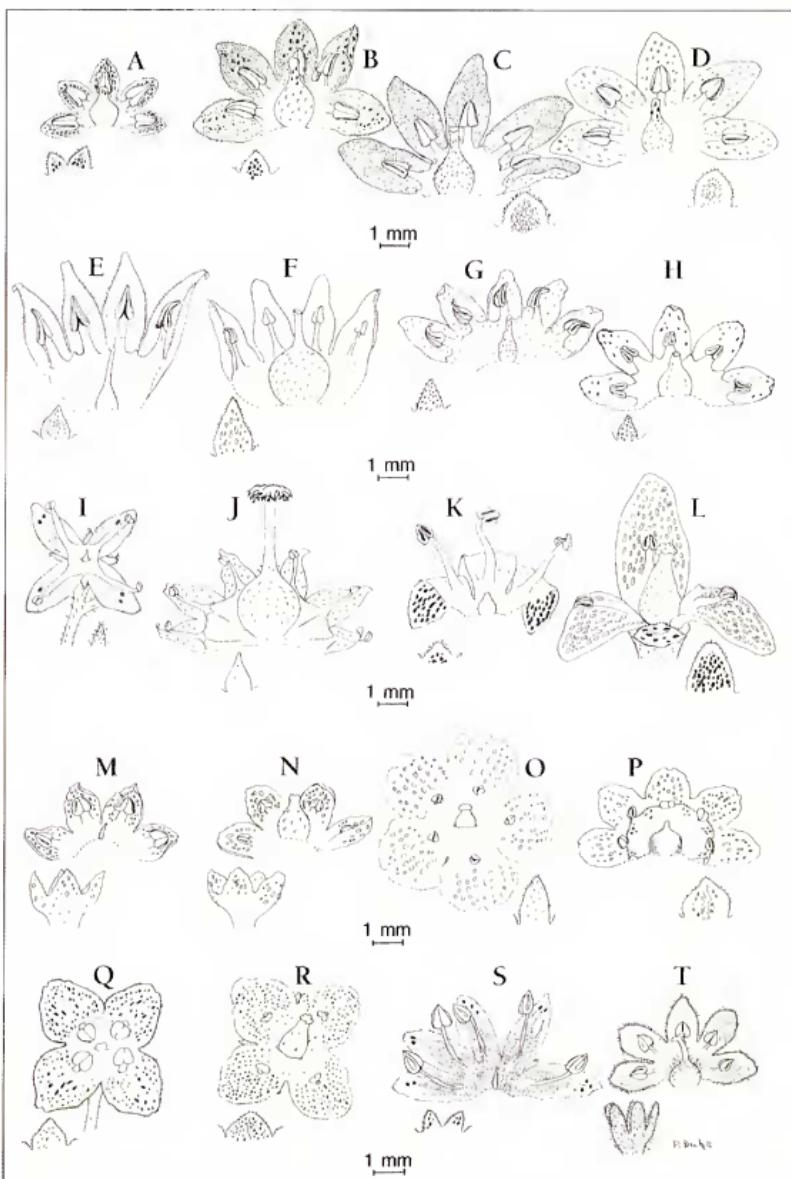


FIG. 6. Representative flowers of *Cybianthus* subgenera and sister genus, *Embelia*, open flowers in anthesis above, calyx lobes below. A–B, Subgenus *Microconomorpha*, (*Cybianthus pastenensis*), note monomorphic flowers. A. Staminate flower (Killip & Garcia 33886). B. Pistillate flower

nate flowers. The staminate flowers are usually larger than the pistillate ones. The flowers are usually 4 or 5(–6)-merous, but they are 3-merous in subgenus *Triadophora* (Fig. 6K, 6L). The majority of species are homomerous, but *Cybianthus kayapii* has heteromerous flowers, (the calyx 4- and the corolla 5-merous), and in *C. anthuriophyllus*, the calyx 6- and the corolla 5-merous. Either or both whorls of the perianth may be membranaceous, chartaceous, coriaceous or carnose, epunctate, punctate or punctate-lineate. The punctations may be inconspicuous or conspicuous, prominent (raised) or not, pellucid, brown, orange or red. The calyx may be valvate or imbricate, and may be cotyliform, cupuliform or urceolate. The corolla is valvate or imbricate, and may be campanulate, cupuliform, tubiform, infundibuliform, salverform, rotate or subrotate. The stamens and staminodes are similar in morphology, but the staminodes are smaller. The filaments of the stamens and staminodes are partially united at the base to form a conspicuous or inconspicuous, membranaceous, chartaceous or carnose tube, except in subgenus *Cybianthus*, which has a terete or rarely, angulate staminal tube developmentally fused with the corolla tube, the stamens thus appearing epipetalous. In some species, the tube bears lobes (sterile projections of tissue) which alternate with the apically free portion of the filaments. The apically free portions of the filaments may be terete, flat, or absent. The anthers may be dorsifixed, basifixed or versatile. Anthers may be lanceolate, ovate, quadrate, or deltate, apiculate, acute, truncate or emarginate, the apiculate ones may have the apiculum erect, distally or proximally recurved, glabrous or glandular-papillate. Antherodes of the pistillate flowers are similar to the anthers but reduced in size, and normally devoid of pollen, but occasionally, they may produce copious amounts of abortive pollen (Pipoly 1983a). The connective may be epunctate or prominently punctate, or rarely glandular-papillate. The pollen is tricolporate and psilate (Fig. 1E). The pistillode may be lageniform, conic or obturbinate. The pistil may be obnapiform,

(Schultes 3226). C–D, Subgenus *Staphia*, (*Cybianthus staphii*). C. Staminate flower (Fassett 25706). D. Pistillate flower (Cuatrecasas 12293). E–F, Subgenus *Laxiflorus* (*Cybianthus spicatus*). E. Staminate flower (Maguire 35525). F. Pistillare flower (Prance et al. 3359). G–H, Subgenus *Conomorpha* (*Cybianthus laurifolius*). G. Staminate flower (García-Barriga & Jaramillo 19841). H. Pistillate flower (Grubb et al. 744). I–J, Subgenus *Conomyrsina*. I. Staminate flower, *Cybianthus sprucei* (Cuatrecasas 16272). J. Pistillate flower, *Cybianthus kayapii* (Acosta-Solis 5544). K–L, Subgenus *Triadophora*, (*Cybianthus schlimii*). K. Staminate flower (Haught 1502). L. Pistillate flower (Herrera 1720). M–N, Subgenus *Weigeltia*, *Cybianthus* sp. nov. M. Staminate flower (Maas & Westra 4459). N. Pistillare flower (Maguire & Fanslau 40590). O. Subgenus *Cybianthopsis*, bisexual flower, (*Cybianthus sintenisii*, P. Wilson s.n.). P. Subgenus *Grammadenia*, bisexual flower, (*Cybianthus piresii*, Maguire et al. 37052). Q–R, Subgenus *Cybianthus*, (*Cybianthus goyazensis*). Q. Staminate flower (Irwin & Soderstrom 5378). R. Pistillate flower (Herringer 45). S–T. *Emelia* sp. S. Staminate flower (Petelot 3887). T. Pistillate flower (*C. Wang* 76408). Drawing prepared by Peggy Duke.

conic, ellipsoid, or obturbinate, with a punctiform, or capitate stigma. The stigma is large and capitate, with erose-fimbriate lobes and is caducous in subgenus *Comomysine*. The ovary in species from Ecuador and Peru are terete. The placenta may be cotyliform, cupuliform or globose, with 2–4 uniseriate ovules naked or partially immersed. The fruit is a globose or depressed-globose drupe and is one-seeded, with a thick or thin exocarp.

#### ANATOMY

This treatment is not intended to serve as a monograph of the genus, but a few salient anatomical features may prove useful in identifying sterile material or wood samples. Druses (Pipoly 1987-Fig. 8B–C) are ubiquitous in Myrsinaceae, as are pericyclic fibers (Pipoly 1987, Fig. 8A). All Myrsinaceae have resin ducts (canals) at least in the cortex, and in the field, copious amounts of resin are visible in the canals of the pith and secondary phloem, in freshly cut branchlets, in species of subgenera *Grammadenia* and *Laxiflorns*. Aerenchyma in the cortex of the primary stem is unique to subgenus *Grammadenia* and is found in all species (Fig. 7F), except in *Cybianthus lineatus* (Fig. 7E). The pith in primary stems of subgenus *Weigelia* is parenchymatous with large, rounded starch grains, while that of *Cybianthus magnus* has angular collenchyma (Pipoly 1987). It is interesting to note that the collencyma of the outer cortex in *Cybianthus magnus* subsp. *asymmetricus* is tangential rather than angular, while that of *C. magnus* subsp. *magnus* is angular (Fig. 8 D–F). All species of *Cybianthus* have cortical vascular bundles, that may be amphicribal (Fig. 7C) or hemiamphicribal (Fig. 7D), with (Fig. 7C) or without (Fig. 7D) accompanying perivascular fibers. Wood of subgenus *Comomysine* is notable for its thin-walled vessels (Fig. 9D), while the fiber-tracheids of subgenus *Grammadenia* have walls so thick as to significantly occlude the lumina (Pipoly 1987- Fig. 7C). Also, starch is present in the phloem fibers of subgenus *Comomysine* (Fig. 9E, 9F) but not in *Grammadenia*. In leaf anatomy, it is notable that subgenus *Grammadenia* has functionally acrodromous venation. This is due to its unique leaf-node continuum, and consequent primary vascular system (Pipoly 1987-Figs. 7–9; 11–12) where the cathodic and anodic leaf traces are autonomous from each other and from the relevant midrib trace, a system thus far unique among angiosperms. Leaves of subgenus *Triadophora* may be easily recognized by their subepidermal fibers, while those of *Cybianthus lineatus* are unique for their bifacial palisade layer (Pipoly 1987- Fig. 14b).

#### ECOLOGY

In Ecuador and Peru, species of *Cybianthus* occur in wet or moist, tall *terra firme* forest on laterite, limestone or white sand, seasonally inundated igapó or várzea, premontane humid, wet or pluvial forest on laterite or sandstone,



FIG. 7. Primary stem histological features in subgenus *Grammadenia*. A–B. *Cybianthus ptariensis*, (Pipoly et al. 7133), periderm formation, showing epidermal cork development. C. *C. marginatus* (Pipoly 6546), amphicribal cortical bundle without perivascular fibers. D. *C. ptariensis* (Pipoly et al. 7133), hemiamphicribal bundle with perivascular fibers (pf). E. *C. lineatus* (Pipoly 7229), section showing parenchymatous pith, inner and outer cortex. F. *C. marginatus* (Pipoly 6546), section showing aerenchymatous inner cortex; parenchymatous pith and outer cortex. (Bars in Figs. A–F equal to: A. 30 µm, B. 120 µm, C. 48 µm, D. 60 µm, E. 465 µm, F. 120 µm. Figure reproduced from Pipoly, 1987.

cloud forest, elfin forest, montane or subpáramo thickets, or sandstone scrub at high elevation.

The *terra firme* and premontane forest life zones are the richest in endemics, with six and five species, respectively. *Terra firme* is here divided into two

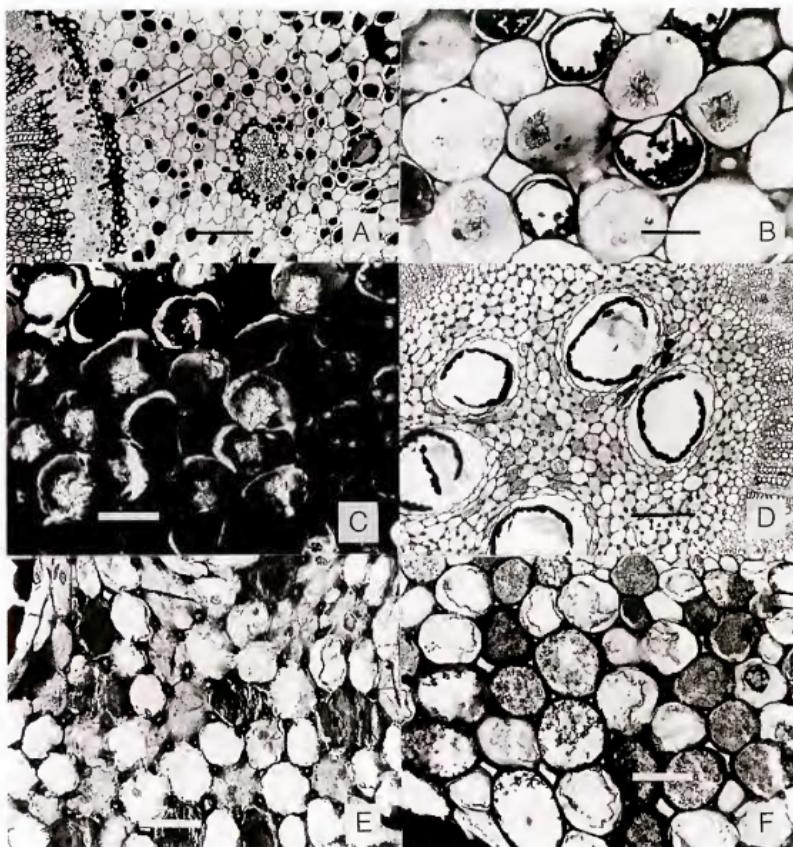


FIG. 8. Primary stem histological features of subgenus *Grammadenia*. A. *C. costaricanus* subsp. *morii* (Pipoly 7017), showing pericyclic fibers (arrow). B. *C. costaricanus* subsp. *costaricanus* (Pipoly 7068), showing druses in pith. C. *C. costaricanus* subsp. *panamensis* (Pipoly 7056), showing druses in pith, using polarized light. D, E. *C. magnus* subsp. *magnus* (Pipoly 6453), showing angular pith collenchyma. F. *C. magnus* subsp. *asymmetricus* (Luteyn, Pipoly et al. 10415), showing transitional tangential pith collenchyma. (Bars in Figs. A-F equal to: A. 195 µm, B. 45 µm, C. 48 µm, D. 230 µm, E. 74 µm, F. 60 µm.) Figure reproduced from Pipoly, 1987.

edaphic categories, lateritic and white sand (often referred to as "varillal" by Peruvians) and is defined as lowland tall moist or wet forest which is not inundated. The canopy normally reaches 35 meters, with very few emergent individuals. In the lateritic *terra firme*, *Cybianthus kayapii*, *C. schlimii*, *C. pseudolongifolius*, *C. vasquezii*, *C. ceneensis*, *C. grandezi*, *C. fuscus*, *C. jenisonii*,

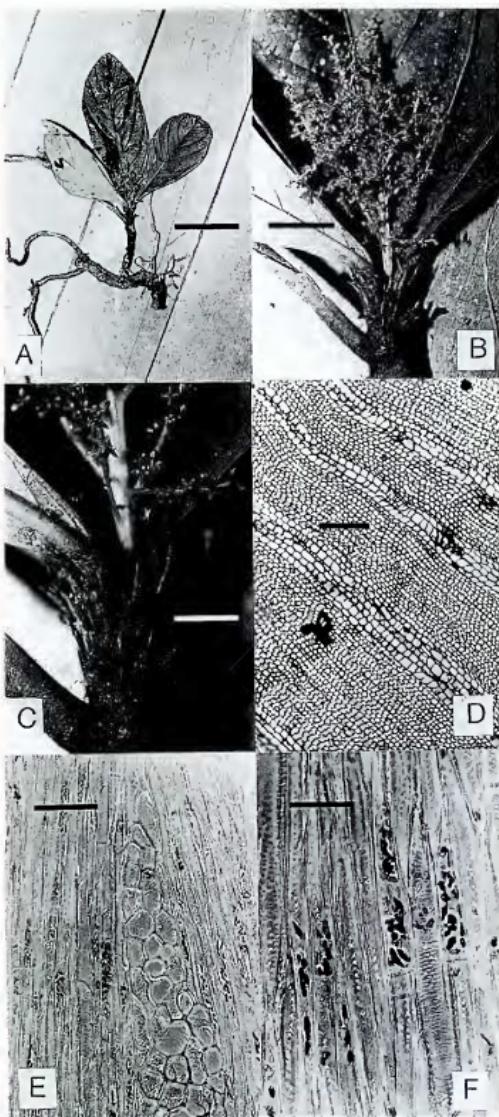


FIG. 9. Morphological and anatomical features of subgenus *Comomysine* (*Cybianthus kayapii*, Pipoly et al. 12490). A. Habit, showing bayonet reiteration. B. Habit, showing pyramidal, bipinnate panicle and leaf tapering to obtuse base. C. Stem apex, showing cataphylls. D. Transverse wood section, showing thin-walled vessels. E. Tangential wood section, showing rays and phloem fibers-tracheids. F. Phloem fiber-tracheids, showing starch grains. (Bars in Figs. A–F, A. 12.6 cm, B. 2 cm, C. 1 cm, D. 400 µm, E. 100 µm,

and *C. venezuelanus* are found. *Cybianthus kayapii*, *C. schlimii*, and *C. grandezi* are found on steep banks of small creekbeds, *C. cenebensis* and *C. venezuelanus* are ridgetop species, and *C. cenebensis*, *C. jensonii*, *C. vasquezii* and *C. pseudolongifolius* grow along terraces above larger rivers. Vásquez (1997) has described "Irapayal," "Yarinal" and "Supay Chacras" associations within the lateritic *terra firme*, but with so few comparative, quantitative forest inventories completed for both countries, I am not able to precisely list the *Cybianthus* species known from each. The *terra firme* forests on white sand (varillal) are shorter in stature than those on lateritic soils, and generally support lower numbers of lianas. Among the varillal forest types described for Peru, Vásquez (1997) lists "varillal seco," "varillal húmedo" and "chamizal" or "ojos de varillal" associations, only some of which have been noted on label data. However, *Cybianthus peruvianus*, *C. spicigeri*, and *C. gigantophyllus* occur on rolling hills in the varillal forest type. Among those species which occur on steep hillsides near light gaps, *Cybianthus gigantophyllus* is most notable, as it occurs in the ecotonal area between forest gaps and mature forest. *Cybianthus nanayensis*, a subshrub, is frequently found in gaps left by large treefalls in overmature forests, and along trailsides, where it occurs in the rather dense herbaceous stratum. *Cybianthus resinosus*, another inhabitant of the *terra firme* forest on white sand, occurs on terraces above black water rivers in the forest, while *C. nestorii* is found in the more open shrubby "varillal seco" transitional area near the riverbank. *Cybianthus fulvophilverulentus* subsp. *magnoliifolius* typically occurs in campina, or campinarana formations in Brazil, but in Peru it has been collected once in the "varillal seco" an open shrubby area on white sand several hundred meters from a black water riverbank. Unfortunately, no literature directly addressing this forest type is known for Ecuador.

The two forest types subject to inundation have been divided into várzea, flooded by white water, and igapó, flooded by black or black and white water. The other significant difference between these two forest type is that in várzea, the forest is inundated for a much shorter time than that of the igapó. To date, I know of no documentation for occurrences of forests inundated by clear water in Ecuador or Peru, as they are found elsewhere in Amazonia (Brazil, Colombia, Venezuela), but are best developed in Colombia. Three species are known from igapó, with no endemics. *Cybianthus guyanensis* subsp. *pseudoicacorensis* is found in the igapó at its limit with *terra firme*, while *C. penduliformis* is found well within the igapó and is frequently found in standing water. *Cybianthus spicatus* is found both in igapó and várzea, and exhibits both staminate and pistillate ecotypes, with some exhibiting apparent random variation. It is a broadly ranging polymorphic ochlospecies (*sensu* Pipoly 1983a) with great morphological variation. The known Peruvian populations, from Huánuco and San Martín, are identical to those found in central Guyana (Pipoly 1983a). The other várzea species, *Cybianthus cyclopetalus*,

is known only from Madre de Dios in Peru, and from the Juruá area in Brazil. It grows in the margin of várzea near its junction with the *terra firme* forest. Forest associations within the várzea have been described by Vásquez (1997), but I have been unable to match the corresponding complement of *Cybianthus* species, owing to inadequate label data. The three forest associations present in várzea for Peru include, "barrillal," "restinga" and "bajial." Clearly, more fieldwork is needed to discern floristic differences among these association types.

Premontane forest habitats are found from scarcely above 200 m to nearly 1,000 m. The forest is lower in stature than the *terra firme*, have a greater epiphyte load, and a larger number of lianas. Those on sandstone are distinguished here from those on other soils. On sandstone, three species are found of which one, *Cybianthus timanae*, is endemic. The other species, *Cybianthus comperuvianus*, a new taxon described herein, is known from these forests in Peru, Bolivia and adjacent Brazil. The other premontane forest formation on lateritic soils hosts 9 species, *Cybianthus minutiflorus*, *C. huampamiensis*, *C. granulosus*, *C. poeppigii*, *C. schlimii*, *C. peruvianus*, *C. fosteri*, and *C. venezuelanus* and *C. flavovirens*. Among these, only *Cybianthus venezuelanus*, *C. poeppigii*, *C. schlimii* and *C. peruvianus* are not endemic. A surprising new distribution record for *Cybianthus lepidotus*, from Bagua Province, Imaza District, of Amazonas Department, Peru, is recorded here. *Cybianthus lepidotus* was once thought to be a Guayana Highland endemic, but was found in Bolivia in the Maipiri region on the sandstone "laja" formations there (Pipoly 1992a). This kind of disjunction, concomitant with those for species such as *Cybianthus spicatus*, and *Cybianthus lineatus* (see below), support recent thematic map data at NASA, showing that the Ecuadorean/Peruvian area north, slightly east, and immediately south of the Cordillera del Cónedor, contains significant sandstone formations that may constitute "tepui satellites" (sensu Maguire 1979). Clearly, much more exploration in southeastern Ecuador and northern Peru, should be a high research priority.

There are six species of *Cybianthus* known from cloud forests. *Cybianthus pastensis* and *C. incognitus* are found in areas of high shade and moisture within these forests. Along the margins to the leeward side, in that portion of the Chocó Floristic Province that extends into Ecuador, *Cybianthus cuatrecasasii* may be found, while on the eastern Andean slopes of Peru, *C. laetus* grows in exposed, wind-swept margins of the forest. The lack of records for *Cybianthus laetus* in Ecuador is more likely a collection artifact than a reflection of its rarity, given its occurrence in the Department of Boyacá, Colombia. It is notable that *Cybianthus patensis* and *C. incognitus*, when growing at elevations below 1,000 m, are ridgetop species. *Cybianthus magnus* subsp. *magnus* is an obligate epiphyte in closed cloud forests, growing in the forks of trees or on deep detritis, and shielded from winds.

Elfin forests and montane thickets are transitional formations below the jalca (a formation like a páramo but without species of the Asteraceae subtribe Espeletiniae). Elfin forests host considerable numbers of trees and usually have trees up to 5 m tall. The montane thicket (subpáramo) grows in more exposed areas at higher elevations and is dominated by low shrubs and small trees to 2 m, with broad crowns. *Cybianthus marginatus* is found in both of these habitats, but the leaves and stature of the plants are much smaller in the thicket formation. Also, the verrucose papillae of the stem are much more pronounced in the thicket habitats than in plants growing in the elfin forest. *Cybianthus magnus* subsp. *asymmetricus* grows in open montane forests or subpáramo thickets, and elfin forests, where it is subject to exposure to the high winds and rain. Its leaf variation is significant, but it is easily recognized from subspecies *magnus* by the hydropotes of the adaxial leaf surface and orange punctations of leaf, inflorescence and perianth parts and the unique white, then lavender fruits.

Finally, sandstone scrub, called "pajonal," is known thus far only from Peru. It is the formation growing at the highest elevations where Myrsinaceae occur, mostly well over 3,000 m. In these habitats, there are few, small shrubs which rarely exceed 1.5 m tall. *Cybianthus lineatus* is found in this habitat, the first locality for this species outside the contiguous Guayana Highland. No similar habitat has been described in Ecuador, but it may be present in the Cordillera del Cóndor.

#### TAXONOMIC CONCEPTS, NOTES ON KEYS AND SPECIMEN CITATIONS

My species concept follows that of Wiley (1978, 1981), who defined a species as follows: "An evolutionary species is a single lineage of ancestor-descendant populations which maintains its identity from other such lineages and which has its own evolutionary tendencies and historical fate." My subspecies concept (Pipoly 1987), defines a subspecies as follows: "groups of populations within a single lineage of ancestor-descendant populations that show variation by unique combinations of plesiomorphies, or homoplastic apomorphies, correlated with biogeography and/or ecology. This rank is primarily used to convey information regarding variation in the life histories of these populations and character state differences hypothesized to be the result of this variation. The subspecific rank in no way attempts to predict speciation events."

The keys are artificial and designed to expedite identification of herbarium specimens. An attempt has been made to emphasize vegetative characters to increase the keys' usefulness with sterile material. The numbers appearing before the taxa refer to their respective position in the key; any correlations with phylogenetic relationships are coincidental. Quantitative and qualitative data presented in keys and descriptions for floral parts and bracts were taken from organs rehydrated from herbarium specimens by boiling in water.

Measurements from these range from 10% to 15% greater than those measurements taken directly from dried material. Data regarding stem diameters, inflorescence rachises, pedicels, leaf, and fruit shape were taken from dried herbarium specimens. Extra-Ecuadorean and -Peruvian specimens are cited for all new species and for recent collections of other species used to significantly amplify previously published morphological descriptions (Pipoly 1981, 1983a, 1983b, 1987, 1988, 1991, 1992a, 1993, 1994, 1995, 1996).

A description of the genus *Cybianthus* and a key to its subgenera in Ecuador and Peru are provided below. This description, along with that of the subgenera and species that follow include features found in each taxon as a whole, including those populations and species occurring outside Ecuador and Peru. Phylogenetic studies applicable to species in this treatment may be found in Pipoly (1987) and in the forthcoming *Flora Neotropica* treatment.

#### TAXONOMIC TREATMENT

***Cybianthus* Mart., Nov. Gen. Sp. Pl. 3:87. 1831. *nom. et typus cons.*; G. Agostini, Acta Biol. Venez. 10:141. 1980.; Pipoly, Mem. New York Bot. Gard. 43:46. 1987; Pipoly, Ann. Missouri Bot. Gard. 79:913. 1992. TYPE SPECIES: *C. penduliflorus* Martius.**

Terrestrial or epiphytic, monoaxial or polyaxial, dioecious, monoecious or polygamous shrubs or trees to 15 m tall. Roots positively geotropic or dia-geotropic. Branchlets glabrous, glandular-granulose, dendroid- and stellate-tomentose, furfuraceous- or ferrugineous-stipitate-lepidote. Leaves sessile or petiolate, alternate, subopposite, or pseudoverticillate, the venation camptodromous or rarely acrodromous; petioles obsolete or when present, canaliculate or marginate, tapering gradually to the base, or abruptly swollen toward the base, here termed "pulvinate." Inflorescence: staminate, pistillate, bisexual or polygamous, lateral (axillary), a simple raceme, panicle of racemose or spicate (rarely corymbose) branches, a pleiochasium, or an indeterminate umbel appearing racemose. Flowers functionally unisexual or bisexual, 3–6(–7)-merous; calyx cotyliform to cupuliform, the lobes imbricate, valvate or aberrantly contorted, basally connate 1/5–2/3 their length, abaxially glabrous, glandular-granulose, ferrugineous stipitate-lepidote, or translucent-lepidote, adaxially glabrous, epunctate or prominently orange, red or black punctate, the lobes entire to erose-fimbriate, glabrous or glandular-ciliate; corolla rotate, subrotate, cupuliform or campanulate, rarely infundibuliform or salverform, the lobes imbricate or valvate, basally connate 1/5–3/4 their length, abaxially glabrous, glandular-granulose, or ferrugineous stipitate-lepidote, adaxially glandular-granulose at least at the junction of the tube and lobe, the margin entire to erose-denticulate, glabrous, glandular-granulose or rufous glandular-papillate; stamens and staminodes adnate to corolla tube at least 2/3 their length, the filaments variously connate to form a tube, the staminal tube adnate to the corolla tube or at times

developmentally fused with it (thus the stamens appearing epipetalous), bearing fleshy lobes alternate with the apically free portions of the filaments or not, the anthers erect or distally curved, ovate, widely ovate, or triangular, basifixied or dorsifixied, apically acute, rounded, truncate, emarginate or minutely apiculate, the apiculum erect, proximally or distally curved, basally truncate, cordate, or rarely hastate, dehiscent by apically pores, confluent apical pores (birimose), or by wide or narrow longitudinal slits; pollen tricolporate, psilate; staminodes morphologically similar to the stamens but greatly reduced in size, the antherodes at times producing abortive pollen; pistil obnapiform, ellipsoid, umbonate or obturbinate, the ovary sparsely to densely translucent glandular-lepidote, the style glabrous, the stigma capitate, capitellate-lobate, or punctiform, persistent or early caducous, the placenta free-central, carnosae, umbonate or globose, the ovules campylotropous (1)-2-5(-7), uni- or biserrate; pistillode conic, lageniform, obturbinate or irregularly shaped vestigial pistillode, the pistillode hollow or bearing a sterile placenta, rarely absent. *Fruit* drupaceous, 1(-2)-seeded, the endosperm translucent, non-starchy, the embryo small, linear, flexuous, erect or curved, longitudinal or transverse, the cotyledons not well-developed.

*Distribution.*—One hundred sixty-seven species; Nicaragua, Costa Rica south through Panama to the Andes southward to Bolivia, from Colombia eastward across Venezuela and Brazil and the Guianas, then southeastward to the Atlantic coastal forests of SE Brazil.

*Ecology.*—Members of *Cybianthus* are principally riparian, occurring only in primary forests or rarely in somewhat disturbed ones, and thus, may serve as indicators of environmental quality. Throughout the range of the genus, its members are known from wet tepuí savannas, moist scrub, cloud and elfin forests (including "ceja de selva"), subpáramo thickets, montane, premontane, pluvial, wet and moist forests, páramo, jalca, igapó, várzea, varillal, campinas, campo rupestre, restinga, cerrado, and caatinga vegetation types. In Ecuador and Peru, the majority of the species occur in lowland and premontane forests at the junction of Hylaea and the eastern slopes of the Andean Cordillera (see ECOLOGY section).

*Cybianthus* is most closely related to the paleotropical lianous genus *Embelia* (Pipoly 1987), and cladistically defined by the unique glandular-granules at the corolla lobe and tube junction. For practical purposes of identification, the combination of lateral racemes or spikes, or racemose or spicate panicles, and filaments which are shorter than the corolla, connate at least 1/4 their length, and adnate to the corolla at least 1/3 its length, allows for easy recognition.

#### KEY TO SUBGENERA OF CYBIANTHUS IN ECUADOR AND PERU

1. Corolla cotyliform, cupuliform, campanulate, or rarely salverform; anthers longer than wide, distally recurved, apically acute or minutely apiculate.

2. Branchlets glabrous or glandular-granulose; anthers dehiscent by narrow longitudinal slits ..... **I. Microconomorpha**
2. Branchlets ferrugineous tomentose or stipitate-lepidote; anthers dehiscent by wide longitudinal slits.

  3. Branchlets and calyx ferrugineous stipitate-lepidote; abaxial corolla surface glabrous near margin ..... **II. Conomorpha**
  3. Branchlets ferrugineous tomentose, calyx glandular-granulose or glabrous, rarely ferrugineous tomentose; abaxial corolla surface glandular-granulose near margin. ..... **III. Laxiflorus**

1. Corolla rotate to subrotate; anthers wider than long, erect, apically rounded to truncate or emarginate.

  4. Petioles abruptly swollen basally; anthers dorsifixed, longitudinally dehiscent.
  5. Plants monoaxial; anthers erect, not versatile.
  6. Stem glandular papillate, at times with hydropotes, bearing cataphylls apically and at times, alternating with the leaves; leaves without subepidermal fibers; flowers 4- or 5-merous; corolla lobes epunctate or inconspicuously pellucid or orange punctate, glandular-granulose within; stigma large, capitate-lobate, early caducous, the lobe margins fimbriate ..... **IV. Comomysrine**
  6. Stem with malpighiaceous hairs, without cataphylls, but at times with aborted leaves (pseudocataphylls); leaves with numerous parallel subepidermal fibers (most easily seen adaxially); flowers 3-merous; corolla lobes prominently black punctate, maculate, glabrous within except at lobe and tube junction; stigma small, capitate-lobate, persistent, the lobe margins entire ..... **V. Triadophora**
  5. Plants polyaxial; anthers versatile ..... **VI. Weigelia**

4. Petioles obsolete or not abruptly swollen basally; anthers basifixed, poricidally dehiscent.
7. Leaves sessile, apically mucronate, basally auriculate, the margins scarious; staminal tube merely adnate to corolla tube ..... **VII. Grammadenia**
7. Leaves petiolate, apically acute, acuminate or caudate, basally acute, attenuate or cuneate, the margins opaque; staminal tube developmentally fused to corolla tube, the stamens thus appearing epipetalous ..... **VIII. Cybianthus**

**I. Cybianthus subgenus Microconomorpha (Mez) G. Agostini, Acta Biol. Venez. 10:150. 1980; Pipoly, Wrightia 7:235. 1983. *Conomorpha* A. DC. subgenus *Microconomorpha* Mez in Engl., Pflanzentr. IV. 236(Heft 9):251. 1902. *Microconomorpha* (Mez) Lundell, Wrightia 5:349. 1977. TYPE SPECIES: *Conomorpha verticillata* Zahlbr., Ann. K.K. Naturhist. Hofmus. 7:3. 1892, non Mez (1902). = *Cybianthus pastensis* (Mez) G. Agostini (LECTOTYPE: Agostini, Acta Biol. Venez. 10:150. 1980).**

**Cybianthus** Mart. subgenus *Iteoides* G. Agostini, syn. nov., Acta Biol. Venez. 10:148. 1980. TYPE SPECIES: *Badula iteoides* Benth., Pl. Hartw. 217. 1896. *Conomorpha iteoides* (Benth.) Mez in Engl., Pflanzentr. IV. 236(Heft 9): 254:1902. TYPE SPECIES: *Cybianthus iteoides* (Benth.) G. Agostini, Acta Biol. Venez. 10:149. 1980.

Terrestrial monoecious, dioecious or polygamous shrubs or small trees. Bark smooth to slightly fissured, light brown, thin. Root positively geotropic. Trunk distinguishable, leptocaulous, the growth dynamics following Rauh's

Architectural Model (Hallé et al. 1978). *Branchlets* thin, terete, densely ferruginous glandular-granulose, the granules often stipitate. *Cataphylls and pseudocataphylls* absent. *Leaves* pseudoverticillate; blades petiolate, often with translucent glandular lepidote scales. *Inflorescence* a simple raceme or bipinnate panicle, staminate, pistillate, or polygamous, the peduncle 1–4 cm long, densely glandular-granulose; inflorescence and floral bracts, perianth and pistil bearing prominently raised red or black punctations; inflorescence bracts large, often foliaceous and persistent; floral bracts linear-lanceolate, the margins glandular-ciliate, caducous, the pedicels erect, accrescent in fruit. *Staminate, pistillate and bisexual flowers* monomorphic (similar in shape), the staminate the largest, the pistillate the smallest in size, white to yellowish-green, (4–) 5(–6)-merous; calyx cotyliform, the lobes valvate, the margins densely glandular-ciliate; corolla cotyliform to campanulate, the lobes imbricate, glabrous without except glandular-granulose near the margin, glandular-granulose over the entire surface within; stamens and staminodes with a conspicuous staminal tube, the apically free portions one to three times longer than the anthers, the anthers elongate-triangular to ovate, prominently curved distally, apically obtuse to apiculate, basally cordate to hastate, dorsifixed 1/3 to more than 1/2 length from base, dehiscent by narrow longitudinal slits, the staminodes producing abortive pollen grains; pistil in pistillate and bisexual flowers obturbinate, the ovary densely translucent-lepidote, the style thick, truncate, the style punctiform, the placenta umbonate, bearing 3–4 uniseriate ovules immersed in placental tissue, but exposed apically by placental pores; pistillode similar to pistil but reduced in size, hollow or bearing 2 abortive ovules. *Fruit* drupaceous, 1-seeded, the exocarp thin, prominently black punctate.

Subgenus *Microconomorpha* contains 5 species, of which one, *Cybianthus pastensis* (Mez) G. Agostini, is known from Ecuador and Peru. I earlier indicated that there was no evidence to support subgenus *Iteoides* as a separate entity (Pipoly 1987), so it is treated here in synonymy under subgenus *Microconomorpha*.

1. ***Cybianthus pastensis* (Mez) G. Agostini** (Fig. 3c), Acta Biol. Venez. 10:151. 1980. *Conomorpha pastensis* Mez in Engl., Pflanzent. IV. 236(Heft 9):252. 1902. *Microconomorpha pastensis* (Mez) Lundell, Wrightia 5:349. 1977. TYPE: COLOMBIA. NARIÑO: "Páramo de Purugai, Prov. de Pasto," 2,500 m, 1866 (stam. fl.), J. Triana 2585 (LECTOTYPE (Pipoly 1983a); W; ISOLECTOTYPES: C, COL, G, P).

*Myrsime verticillata* C. Presl, Reliq. Haen. 2:64. 1835. *Conomorpha verticillata* (C. Presl) Mez in Engl., Pflanzent. IV. 236(Heft 9):252. 1902, non Zahlbr. (1892). *Conomorpha preslii* J.F. Macbr., Candollea 5:398. 1934. *Microconomorpha verticillata* (C. Presl) Lundell, Wrightia 5:349. 1977. TYPE: PERU. HUANUCO: without further locality, without date, (stam. fl.), T. Haenke 98 (LECTOTYPE (Pipoly 1983a); PR; ISOLECTOTYPES: HAL, W). Non *Cybianthus verticillatus* (Vell.) G. Agostini, Acta Biol. Venez. 10:168. 1980. *Conomorpha verticillata* Zahlbr., Ann. K. K. Naturhist. Hofmus. 7:3. 1892, non C. Presl

- (1835) *Conomorpha jelskii* Mez in Engl., Pflanzenr. IV. 236(Heft 9):251. 1902, nom. superfl. *Conomorpha preslii* J.E. Macbr. var. *jelskii* (Mez) J.E. Macbr., Field Mus. Nat. Hist., Bot. Ser. 13:201. 1959. *Microconomorpha jelskii* (Mez) Lundell, Wrightia 5:349. 1977. TYPE: PERU. CAJAMARCA: Cutervo, Apr. 1879 (stam. fl.), *C. von Jelski* 11 (HOLOTYPE: W; photo and fragment, F, F Neg. 31980).
- Conomorpha dentata* Mez in Engl., Pflanzenr. IV. 236(Heft 9):252. 1902. *Microconomorpha dentata* (Mez) Lundell, Wrightia 5:349. 1977. TYPE: ECUADOR. PICHINCHA: In cordillera from Quito to Tungurahua, 2,000–3,000 m, 1857–9 (stam. & bisex. fl.), R. Spruce 5175 (LECTOTYPE (Pipoly 1983a): K; ISOLECTOTYPES: BM, BP, C, CGE, GH, GOET, LD, LE, F Neg. 22956).
- Conomorpha quercifolia* Mez in Engl., Pflanzenr. IV. 236(Heft 9):253. 1902. *Microconomorpha quercifolia* (Mez) Lundell, Wrightia 5:349. 1977. TYPE: PERU: without locality, without date (stam. fl.), *J. Pavón s.n.* (LECTOTYPE (Pipoly 1983a): G).
- Conomorpha panamensis* Lundell, Wrightia 5:290. 1976. *Microconomorpha panamensis* (Lundell) Lundell, Wrightia 5:349. 1977. *Cybianthus morii* G. Agostini, Acta Biol. Venez. 10:154. 1980. TYPE: PANAMA. CHIRIQUI: Cerro Pando, on continental divide and Panama-Costa Rica border, ca. 16 km W of Hato del Volcán, 2,000–2,482 m, 20 Jul 1975 (stam. fl.), S. Mori & A. Bolten 7292 (HOLOTYPE: LL-TEX; ISOTYPE: MO).

*Shrub or tree to 6 m tall. Branchlets and inflorescence densely ferrugineous glandular-papillose, the branchlets angulate to prominently ridged, (1.5–) 2–3 mm diam. Leaves pseudoverticillate; blades membranaceous to coriaceous, narrowly oblanceolate to oblong or obovate, (3.0–)6.5–14.5(–21.0) cm long, (1.2–)2–4.5(–6.8) cm wide, apically attenuate, acute or acuminate, basally cuneate, not decurrent on the petiole, prominently punctate and minutely ferrugineous stipitate-papillose above and below, the midrib impressed above, raised below, the secondary veins 7–15 pairs, prominently raised below, the margin undulate, lobate, crenate or dentate, rarely subentire; petioles marginate, (0.2–)0.5–2(–2.7) cm long, densely glandular-papillose. Staminate, pistillate or polygamous inflorescence: monomorphic, erect or lax, a simple raceme, 1.8–5.5 cm long, the rachis thin to thick, densely glandular-papillose; inflorescence bracts chartaceous, obovate to elliptic, (4.3–)6–11 mm long, 3–7 mm wide, apically acute to acuminate, basally cuneate, densely and prominently red punctate; floral bracts chartaceous, linear-lanceolate, (0.8–)1.4–2.2(–7) mm long, 0.6–0.8 mm wide, apically attenuate, caducous; pedicels cylindrical, (1.3–)2–7(–7.5) mm long, densely glandular-papillose. Flowers (4–)5-merous, white to yellowish-green; calyx chartaceous, shallowly cotyliform, (0.6–)0.8–1.1(–1.5) mm long, unequally divided, the tube 0.2–0.5 mm long, the lobes suborbicular to very widely ovate, (0.4–) 0.6–1 mm long and wide, rounded to acute apically, glabrous, densely and very prominently orange or black punctate, the margin subentire to erose-dentate, densely glandular-ciliate; corolla chartaceous, cotyliform, 2–2.6(–3.6) mm long, the tube 0.2–0.3 mm long, the lobes ovate to narrowly ovate, 1.7–2.3(–2.8) mm long, 0.8–1.3(–1.5) mm wide, highly reflexed at anthesis, apically rounded to obtuse, prominently orange or black punctate; stamens*

and staminodes 1–1.6(–2.5) mm long, the staminal and staminodial tube 0.7–1.8 mm long, the apically free portions of the filaments 0.3–0.7 mm long, the anthers elongate-triangular, 0.6–1.2 mm long, apically obtuse, basally hastate, the connective red punctate ventrally and dorsally, dorsifixed ca. 1/3 to slightly less than 1/2 from base; pistil and pistillode 1.2–1.8 mm long, the ovary (0.6–)0.8–1 mm long, 1–1.3 mm diam., densely translucent glandular-lepidote, the style thick, 0.5–0.8 mm long, the stigma punctiform, the pistillode hollow or containing one abortive ovule. *Fruit* globose, green, then red, then black at maturity, 3–4 mm diam. when dried exocarp thin, prominently pelliculid punctate.

*Distribution.*—Costa Rica to Colombia, southward to Peru, from 1,500–3,200 m elevation.

*Ecology and conservation status.*—*Cybianthus pastensis* is known from premontane and montane pluvial and cloud forests, and at elfin forest margins. Populations in areas exposed to winds have more coriaceous leaves and shorter stature, frequently as small as one meter in height. The wetter the habitat, the more membranaceous the leaves become, and the longer the inflorescences. Fieldwork in Colombia has shown that populations may contain six individuals per hectare, and that the population rapidly dwindles in areas of disturbance. Owing to population dynamics thus far observed, *Cybianthus pastensis* should be considered threatened.

*Etymology.*—The specific epithet refers to the area from which the type specimen was collected, near the city of Pasto, Department of Nariño, Colombia.

Representative specimens examined. COLOMBIA. Antioquia: Mpio. Urrao, Parque Nacional Natural "Las Orquídeas," Vereda Calles, Permanent Premontane Rainforest Inventory Plot, right bank of Río Calles, 06° 32' N, 76° 19' W, 1,450–1,500 m, 29 Nov 1993 (fr.), J. Pipoly, A. Cogollo *et al.* 17322 (BRIT, COL, JAUM, MO), limits of Parque Las Orquídeas, left bank of Río Calles, 1,450–1,500 m, 30 Nov 1993 (ster.), J. Pipoly, A. Cogollo *et al.* 17376 (BRIT, JAUM, MO); near limit of Parque Las Orquídeas, Alto de Palmitas, ca. 1 km from INDERENA Cabafía Calles, 1,300–1,400 m, 1 Dec 1993 (ster.), J. Pipoly, A. Cogollo *et al.* 17505, 17523 (BRIT, JAUM, MO), 2 Dec 1993 (fl bud), J. Pipoly, A. Cogollo *et al.* 17534 (BRIT, COL, JAUM, MO), Right bank of Río Calles, 1,350–1,450 m, 7 Dec 1993 (stam. fl), J. Pipoly *et al.* 17881 (BRIT, COL, JAUM, MO); Along trail to Finca La Quince, above Urrao, 06° 30' N, 76° 10' W, 2,500–2,800 m, 21 Nov 1988 (stam. fl), G. McPherson *et al.* 13212 (BRIT, HUA, MO); Mpio. Frontino, Región de Murrí, ca. 13 km from Nutibara, 06° 40' N, 76° 20' W, 2,000 m, 9 Dec 1988 (pist. fl, fr), G. McPherson *et al.* 13397 (BRIT, HUA, MO). Norte de Santander: San Antonio, W of Cali, near summit of Cordillera Occidental, 1,9800–2,350 m, 26 Feb–2 Mar 1939 (stam. fl), E. Killip & A. García 33886 (A, S, US). ECUADOR. Azuay: Chiguinda, on E slopes of cordillera E of Sigsig, 03° 12' S, 78° 36' W, 1,600–1,800 m, 1889 (stam. fl), F. Lebmann 5143 (K-2 sheets). Carchi: Páramo de Achupallas, 01° 46' S, 78° 33' W, 2,000–3,000 m, 1899 (stam. fl), F. Lebmann 6202 (K-2 sheets); From Prima Vera about 6 hrs. hike up Río Gualchan Drainage to Nilo Ortiz shelter, 00° 50' N, 77° 72' W, 1,930–2,200 m, 7–8 Jun 1993 (fl bud), J. Bradford *et al.* 55 (BRIT, MO, QCNE). Loja: Cerro Bangala, ca. 10 km E of Yangana, 2,500–2,700 m, 18 Oct 1988 (pist. fl, fr), G. Harling 25313 (GB), (stam. fl), G. Harling 25334 (GB); Cantón

Loja, Carretera Loja-Zamora, at high point,  $03^{\circ} 58' S$ ,  $79^{\circ} 04' W$ , 2,400–2,600 m, 23 Dec 1991 (pist. fl), *D. Rubio et al.* 2252 (BRIT, MO, QCNE); Loja, 3,500 m, 1 Dec 1876 (stam. fl), *E. André* 4551 (F, K, NY); Divide between Quebrada Jipirú and E fork of Río Zamora, W slope of Cordillera de Zamora (El Cónedor), 9 km E of Loja,  $04^{\circ} 00' S$ ,  $79^{\circ} 06' W$ , 2,700 m, 19 Feb 1945 (stam. fl), *F.R. Fosberg & M. Giler* 23119 (NY, US); Loma de Loro, 6 km S of Saraguro, on Rd. to Loja, 3,200 m, 11 Feb 1985 (stam. fl), *G. Harling & L. Andersson* 21594 (AAU, S); Saraguro-Loja Rd., km 12.4, turnoff toward Fierro Urco, Km 3.8–7.1,  $03^{\circ} 42' 33'' S$ ,  $79^{\circ} 18' 03'' W$ , 3,120–3,390 m, 7 Dec 1994 (pist. fl), *P. Jørgensen et al.* 1297 (BRIT, LOJA, QCA, QCNE); W slope of Nudo de Sabanilla, ca. 8 km above Yangana on Rd. to Valladolid, 2,300–2,500 m, 2 Apr 1985 (bisex. fl, fr), *G. Harling & L. Andersson* 23540 (GB); Cerro Toledo, Rd. to La Torre, ca. 7 km SE of Yangana, 2,500 m, 7 Apr 1985 (stam. fl), *G. Harling & L. Andersson* 23842 (GB). Morona-Santiago: Between Campanas and Arenillas, along Río Tintas, 10 leagues SE of El Pan, 2,195 m, 13 Jul 1943 (stam. fl), *J. Steyermark* 53642 (F, NY); Above Mirador, 2,375 m, 9 Sep 1943 (stam. fl), *J. Steyermark* 53897 (F, NY). Napo: 10 km W of Cuyuja, along Quito-Lago Agrio Rd.,  $00^{\circ} 25' S$ ,  $78^{\circ} 00' W$ , 2,700 m, 31 Apr 1983 (stam. fl), *H. Balslev* 42195 (AAU, QCA); Salcedo-Napo Rd., 2,390–2,590 m, 7 Feb 1977 (fr), *J. Brandbyge* 42095 (AAU, QCA); E of Borja, Cerro Antisana, 28 Jul 1960 (stam. fl), *P. Grubb et al.* 1073 (OXF, NY); Sta. Barbara Scumbios,  $00^{\circ} 22' S$ ,  $77^{\circ} 10' W$ , 2,700 m, 10–15 Feb 1959 (stam. fl), *L. Halm-Nielsen* 6818 (AAU, QCA); 8–12 km ESE of Sta. Barbara,  $00^{\circ} 40' N$ ,  $77^{\circ} 30' W$ , 2,780–2,880 m, 11 Jan 1985 (stam. fl), *J. Lutelyn & E. Cottón* 11011 (GB, QCA, NY, VEN); Paso de Guamani, Río Chalpi, at bridge on Papallacta-Baeza Rd., 2,800 m, 6 May 1967 (stam. fl), *B. Sparre* 15940 (GB); Cantón Quijos, Sierra Azul (Agrícola Industrial Río Aragón),  $00^{\circ} 40' S$ ,  $77^{\circ} 55' W$ , 2,300 m, 2 May 1992 (fr), *A. Álvarez et al.* 381 (BRIT, MO, QCNE), (fr), *A. Álvarez et al.* 412 (BRIT, MO, QCNE), Campamento Estero Chico,  $00^{\circ} 41' S$ ,  $77^{\circ} 56' W$ , 2,500 m, 18 Jun 1992 (fr), *A. Álvarez et al.* 490 (BRIT, MO, QCNE); Sierra Azul, Cordillera de Huacamayos,  $00^{\circ} 41' S$ ,  $77^{\circ} 54' W$ , 2,500–2,700 m, 10 Feb 1994 (fr), *A. Álvarez et al.* 1330 (BRIT, MO, QCNE). Tungurahua: On Patate-Triunfo Rd.,  $01^{\circ} 18' S$ ,  $78^{\circ} 25' W$ , 2,950 m, 5 Nov 1983 (stam. fl), *J. Brandbyge & A. Barford* 42506 (AAU, QCA, QNA, S). Zamora-Chinchipe: Rd. from Loja to Zamora, km 14,  $00^{\circ} 04' S$ ,  $79^{\circ} 09' W$ , 2,750–2,770 m, 19–20 Apr 1973 (stam. fl), *L. Holm-Nielsen et al.* 3965 (AAU, QCA). PERU. Amazonas: Prov. Luya, Camporredondo-Tullanya, trail to Cerro Huicsocunga, 2,350 m, 3 Sep. 1989 (fl), *C. Díaz & J. Campos* 3711 (MO, USM); Parte alta de las Montañas de Galeras, 2,000–2,500 m, 20 Jun 1991 (fl bud), *C. Díaz et al.* 4448 (BRIT, MO, USM). Ayacucho: Prov. La Mar, E massif of Cordillera Central, opposing the Cordillera Vilcabamba between Tambo San Miguel, Ayna and Hacienda Luisiana,  $12^{\circ} 45' S$ ,  $73^{\circ} 53' W$ , ca. 30 km SW of Hacienda and Río Apurimac, 21 Aug 1968 (bisex. fl), *T. Dudley* 11915 (F, NA, US). Cajamarca: Prov. Cutervo, 10 km NW of Socota, 3,200 m, 10 Dec 1938 (stam. fl.), *H. Stork & X. Horton* 10134 (F); San Andrés de Cutervo, Parque Nacional de Cutervo, "Jalca," trail to Laguna "El Pileo," 2,680 m, 15 Mar 1989 (fl, fr), *C. Díaz et al.* 3330 (AMAZ, MO, USM); Prov. Jaén, E side of Cordillera E of Huancabamba, 2,400–2,600 m, Apr 1942 (fr), *A. Weberbauer* 6099 (F, GH, US). Huánuco: Prov. Pachitea, region of Pucallpa, W part of Sirá Mountains and adjacent lowland, ca. 26–28 km ESE from Puerto Inca,  $09^{\circ} 25' S$ ,  $74^{\circ} 43' W$ , 2,210 m, 15 Aug 1988 (stam. fl), *B. Wallnöfer* 11-16888 (BRIT, MO, W, WU, USM); SW slope of Río Llulla Pichís Watershed, on the ascent of Cerros del Sirá, top of first cumbre between camp 4 (Peligroso) and camp 5 (Tábano), 1,680 m, 31 Jul 1969 (ster.), *T. Dudley* 13513 (NA). Lima: Prov. Lima, Lima, without date (fr), *J. Pavón s.n.* (K). Madre de Dios: Prov. Manú, Cerro de Pantacolla, Río Plotoa, 10–15 km NNW of Shintuya,  $12^{\circ} 35' S$ ,  $71^{\circ} 18' W$ , 1,000–1,400 m, 15 Dec. 1985 (fr), *R. Foster et al.* 10860 (F, MO, USM).

*Cybianthus pastensis* may be easily recognized by its pseudoverticillate leaves

with variously serrate or incised margins, the very fine inflorescence rachis and minute flowers, and the stipitate papillae of the branchlets, leaves, petioles and inflorescence rachises. The prominent ridges of older branchlets and the swollen pseudoverticels of leaf scars are also distinctive.

**II. Cybianthus subgenus Conomorpha (A. DC.) G. Agostini, Acta Biol. Venez. 10:150. 1980; Pipoly, Ann. Missouri Bot. Gard. 79:908–957. 1992. *Conomorpha* A. DC., Trans. Linn. Soc. London, Bot., 17:102. 1834; *Conomorpha* sect. *Euconomorpha* Miq., Stirp. Surinam. Select. 111. 1850; *Conomorpha* subgenus *Euconomorpha* Mez in Engl., Pflanzenr. IV, 236(Heft 9):254. 1902. TYPE SPECIES: *Conomorpha oblongifolia* A. DC. = *Cybianthus oblongifolius* (A. DC.) G. Agostini (LECTOTYPE: by Agostini, Acta Biol. Venez. 10:151. 1980).**

*Conomorpha* sect. *Aconomorpha* Miq. in Mart., Fl. Bras. 10:304. 1856. TYPE SPECIES: *Conomorpha heterantha* Benth. (LECTOTYPE: Agostini, Acta Biol. Venez. 10:151. 1980) = *Cybianthus guyanensis* (A. DC.) Miq. subsp. *guyanensis*.

Terrestrial dioecious, bisexual, polygamous, or rarely, monoecious *shrubs* or *trees*. Roots positively geotropic. Bark smooth or fissured, brown, or beige, rarely with significant amounts of cork. Trunk distinguishable, leptocaulous, the growth dynamics following Rauh's or rarely, Aubréville's Architectural Model (Hallé et al. 1978). Branchlets thin to moderately thick, terete or ridged, densely to moderately covered with ferruginous stipitate-lepidote scales, the scales at times appressed, rarely glabrescent. Cataphylls and pseudocataphylls absent. Leaves alternate, rarely approaching pseudoverticillate (*C. peruvianus*), petiolate, covered with ferruginous stipitate lepidote scales, often glabrescent above; petioles canaliculate, marginate, or rarely winged. Inflorescence racemose, spicate or paniculate, the panicles with racemose branches, rarely a solitary flower; inflorescence bract small, lanceolate, early caducous; rachis erect or lax, straight or rarely tortuous, ferruginous stipitate-lepidote; floral bracts deltate, lanceolate or ovate, ferruginous stipitate-lepidote, inserted at the base of the pedicel; pedicels cylindrical, at times clavate in fruit or absent, erect, apically recurved, pendent, or nodding, at times accrescent in fruit. Flowers unisexual, rarely bisexual, dimorphic, (3–)4–5(–6)-merous; calyx cotyliform, cupuliform, crateriform, urceolate or patelliform, the lobes valvate, epunctate or with prominent (raised and blisterlike), conspicuous (readily visible but flat), or inconspicuous brown, red or black punctations, the margin entire, rarely crenulate or erose; corolla campanulate to cupuliform, rarely salverform or tubiform, the lobes erect or reflexed, rarely cucullate, valvate or imbricate, ferruginous stipitate-lepidote or glabrous and epunctate or prominently, conspicuously or inconspicuously pellucid, brown, or black punctate without, at times with a narrow line of glandular-granules along the margin, glandular-granulose within, the margins entire or rarely crenulate, glabrous or rarely glandular-granulose; staminodes resembling stamens but reduced in size, the tube conspicuous or inconspicuous, adnate to the co-

rolla, lobate or elobate, the anthers ovate or triangular-ovate, rarely linear-lanceolate, rarely deltate, usually recurved distally, rarely erect, apically acute, or apiculate, rarely rounded, the apiculum dorsally, rarely proximally recurved or erect, the base cordate, dorsifixed from near base to subversatile, the connective punctate or not; pistillode conic to lageniform, rarely absent, translucent-lepidote or glabrous, hollow; pistil obnapiform, rarely conic, the ovary globose, lobed or with an apical apophysis, the style short, the stigma capitate-lobate, 2–3-lobed or punctiform; placenta cupuliform or cotyliform, the ovules 2–4. *Fruit* subglobose, one(–two)-seeded.

*Cybianthus* subgenus *Conomorpha* contains 44 species, 10 of which have been recorded from Ecuador and Peru.

#### KEY TO SPECIES OF CYBIANTHUS SUBGENUS CONOMORPHA

- Branchlets with erect stipitate ferruginous lepidote scales, their margins not appressed; leaf blades subbullate to bullate, the secondary veins somewhat to deeply impressed above, prominently raised below; corolla infundibuliform or tubiform, or appearing so in bud.  
  - Branchlets flexuous, 4–5 mm diam.; leaf blades perpuncticulose above, sparsely lepidote below, the secondary veins 22–26 pairs, the margin irregular; inflorescence tortuous, pinnately to bipinnately paniculate; corolla lobes prominently keeled, rugose without; anthers ventrally recurved. .... 2. *C. gigantophyllus*
  - Branchlets straight, 2–3 mm diam.; leaf blades not perpuncticulose above, densely lepidote below, the secondary veins 8–19 pairs, the margin regular; inflorescence erect, a simple raceme or poorly formed panicle consisting of basally clustered racemes; corolla lobes flat, smooth or verruculose without; anthers dorsally recurved.  
    - Secondary veins 12–16; staminal tube epunctate; pedicels cylindric; calyx cotyliform; corolla membranaceous, infundibuliform, verruculose without; fruit smooth, 3.5–4.5 mm diam.; plants of premontane pluvial forests, subpáramo thickets and upper pluvial cloud forests, 1,000–1,960 m elevation. .... 3. *C. occigranatensis*
    - Secondary veins 8–12; staminal tube punctate; pedicels obconic; calyx urceolate; corolla carnose, tubiform, smooth without; fruit costate, 7–15 mm diam.; plants of white sands or on sandstone, 150–180 (–1,500) m elevation. .... 4. *C. spichigeri*
- Branchlets with appressed ferruginous lepidote scales, the margins appressed; leaf blades not subbullate or bullate, the secondary veins planar or slightly raised above, barely discernible or slightly raised below; corolla campanulate to cupuliform.  
  - Leaf blades coriaceous, rarely chartaceous, the margins subrevolute to revolute.  
    - Leaf blades densely and prominently pustulate at maturity above, the secondary veins 24–28 pairs, inconspicuous below; inflorescence spike (2–)6–16 cm long; flowers subsessile, the pedicels 0.2–0.6 mm long; calyx deeply cupuliform. .... 5. *C. lepidotus*
    - Leaf blades essentially smooth or sparsely pusticulate at maturity above,

- the secondary veins 14–25 pairs, prominently raised below; inflorescence a raceme or panicle with 2–4 racemes branching from base, (2–)3–7 (–8) cm long; flowers pedicellate, the pedicels (0.5–)0.9–1.5 mm long; calyx cotyloidiform.
6. Branchlets subterete, 2–3 mm diam; leaf blades 1.2–2(–2.5) cm wide, smooth above; petioles 5–7(–10) mm long; staminate calyx carnose, 1.2–1.8 mm long; staminate corolla carnose, densely lepidote without, the scales overlapping, 3.2–3.4 mm long, the tube equal to the staminal tube, the lobes symmetric; anthers ovate; fruit with fleshy exocarp; plants of montane and cloud forests on sandstone. .... **6. C. laetus**
6. Branchlets terete, 3–4 mm diam.; leaf blades (2.6–)3.5–5 cm wide, pustulate above; petioles 10–15 mm long; staminate calyx chartaceous, 0.8–1.2 mm long; staminate corolla chartaceous, glabrous or sparsely lepidote without, the scales not overlapping, 2.0–2.6 mm long, the tube shorter than the staminal tube, the lobes asymmetric; anthers linear-lanceolate; fruit with thin exocarp; plants of lowland and lower montane forests on white sands. .... **7. C. peruvianus**
4. Leaf blades chartaceous to membranaceous, the margins flat.
7. Leaf blades membranaceous to subchartaceous; petioles 5–10(–12) mm long; inflorescence a simple raceme or rarely 2-branched at base, 1–3 cm long; corolla salverform or campanulate; fruit globose.
8. Branchlets angulate, 1.5–2 mm diam.; corolla salverform, the staminate 2.2–2.6 mm; plants of premontane forests on sandstone and limestone, (244–)400–1,200 m elevation. .... **8. C. comperuvianus**
8. Branchlets terete, 2–3 mm diam.; corolla campanulate, the staminate, 2.8–3.2 mm; plants of lowland igapó forests, 90–240(–700) m elevation. .... **9. C. guyanensis** subsp. *pseudoicacoreus*
7. Leaf blades chartaceous; petioles (10–)13–17(–22) mm long; inflorescence a panicle with 2–8 racemes branched from base, 4–8 cm long; corolla chartaceous, infundibuliform or cotyloidiform; fruit depressed-globose.
9. Branchlets, petioles, abaxial leaf blades, inflorescence and calyx lobes moderately to densely lepidote, but the non scales overlapping; leaf blades smooth above at maturity; corolla cotyloidiform, the lobes oblong to oblanceolate, flat, smooth without, conspicuously black punctate, apically acuminate; staminal and staminodial tube chartaceous, conspicuous; anthers and antherodes obovate, the apiculum distally recurved; pistillode conic; pistil lageniform ..... **10. C. timanae**
9. Branchlets, petioles, abaxial leaf blades, inflorescence and calyx lobes moderately to densely lepidote, the scales overlapping; leaf blades pustulate above at maturity; corolla infundibuliform, the lobes ovate, verruculose without, inconspicuously brown punctate, apically rounded; staminal and staminodial tube membranaceous, inconspicuous; anthers ovate, antherodes subdeltate, the apiculum proximally inflexed; pistillode lageniform; pistil obnapiform ..... **11. C. cuatrecasasii**
- 2. Cybianthus gigantophyllus Pipoly, (Fig. 2A, 10). Candollea 46:41. 1991.**  
TYPE: PERU. SAN MARTÍN: Pumayacu, between Balsapuerto and Moyobamba, 600–1,200

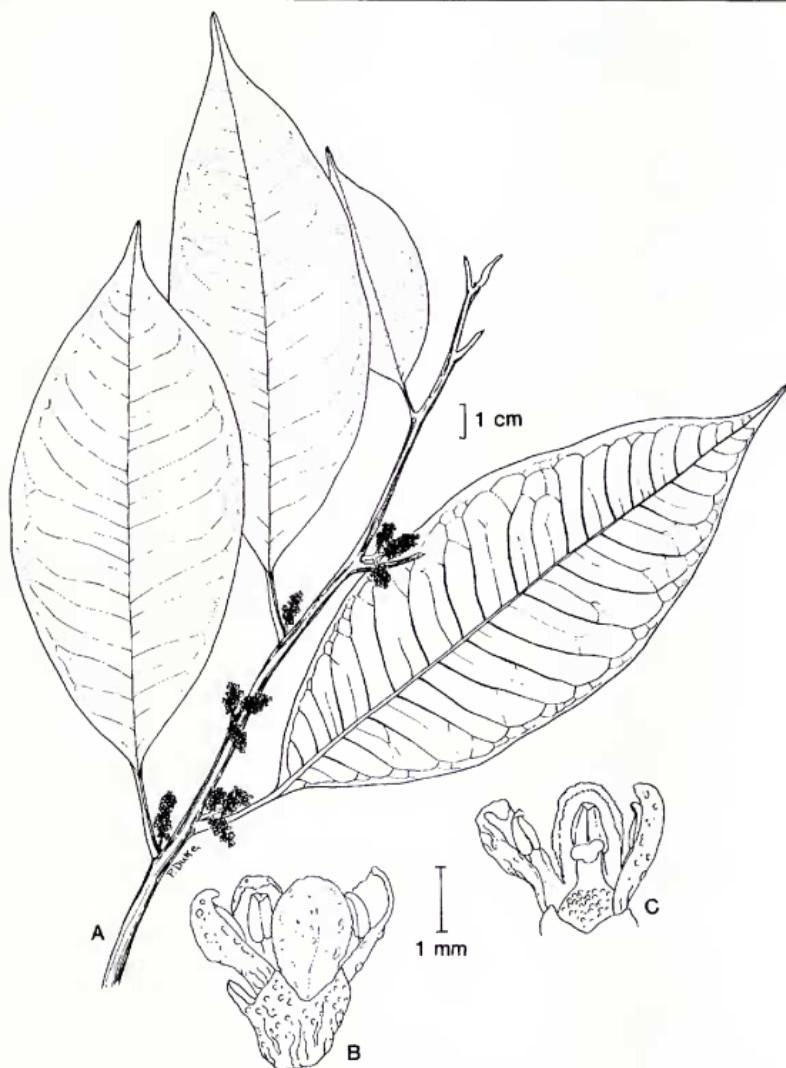


FIG. 10. *Cybianthus gigantophyllus* Pipoly. A. Habit, showing flexuous branchlet, paniculate inflorescences. B. Pistillate flower, showing urceolate calyx and crenulate corolla lobe margins. C. Pistillate flower with one corolla lobe removed, showing cucullate corolla lobe apices, proximally recurved antherodes, and capitate, lobed stigma. A-D, drawn from holotype, by Peggy Duke. Figure reproduced from Pipoly, 1991.

m, Aug–Sep 1933 (pist. fl), G. Klug 3165 (HOLOTYPE: US; ISOTYPES: F, G-2 sheets, GH-2 sheets, MO, NY, US).

*Tree* to 4 m tall. *Branchlets* flexuous, prominently ribbed, 4–5 mm diam., moderately lepidote. *Leaves* alternate; blades chartaceous, elliptic, (15.5)17–27 cm long, (5.9)–7–9.1 cm wide, apically long-acuminate, the acumen 1.2–3.5(–4) cm long, pustulare, perpuncticulose and glabrous above, sparsely lepidote below, midrib slightly depressed above, prominently raised below, the secondary veins 22–26 pairs, slightly depressed above, prominently raised below, the margin irregular, flat, entire; petioles canaliculate, thick, (1.6)–2.7–4 cm long, ca. 3 mm diam., sparsely lepidote, prominently ridged below. *Staminate inflorescence*: unknown. *Pistillate inflorescence*: a pinnate to bipinnate panicle, 1.5–2.5 cm long, tortuous, the branches spicate, moderately lepidote; peduncle 0.3–0.5 cm long, floral bracts carnose, deltate, 0.8–0.9 mm long and wide, apically acute, margin crenulate basally, densely lepidote above and below; pedicels obsolete. *Pistillate flowers* 4-merous; calyx carnose, urceolate, 1.6–1.8 mm long, the tube 0.9–1 mm long, the lobes widely triangular, 0.5–0.7 mm long, 1–1.2 mm wide, apically acuminate-apiculate, the margin regular, entire, lepidote; corolla carnose, campanulate, 2.7–3.1 mm long, the tube 0.2–0.3 mm long, the lobes erect, 2.5–3 mm long, apically rounded to obtuse, prominently cucullate, abaxially carinate, apically rugose and glandular-granulose along the margins without, inconspicuously black punctate, the margin glandular-granulose, erose-crenulate; staminodes 2.3–2.5 mm long, the staminodial tube membranous, inconspicuous, 0.2–0.3 mm long, elobate, glabrous, the apical free portions of the filaments 1.2–1.3 mm long, flat, the anthers ovate, 0.8–1 mm long, 0.6–0.8 mm wide, apiculate, the apiculum ventrally recurved, basally cordate, the connective epuncate; pistil obturbinate, 1.8–2 mm long, 1–1.3 mm diam., the ovary 1.4–1.6 mm long, the stigma capitate, 3–5-lobed, the placenta cupuliform, ovules 3, erect, the upper portions exposed. *Fruit* globose, 4–5 mm long and in diam., exocarp thin, black, inconspicuously pellucid punctate.

*Distribution*.—*Cybianthus gigantophyllus* is known from the headwaters of the ríos Marañón and Huallaga in San Martín, and the Iquitos area, along the Ríos Napo, Nanay and Amazonas in Loreto, at 130–500 m elevation.

*Ecology and conservation status*.—*Cybianthus gigantophyllus* occurs in primary *terra firme* forests, and on white sands (varillal) of lowland Peruvian Amazonia. Given increasing pressure from deforestation, it should be considered threatened.

*Etymology*.—The specific epithet refers to the leaf size, one of the largest known for the subgenus.

*Local names*.—Peru: “ukushnum,” “wewé,” “yakúsnum,” “yakúshnum” (Aguaruna).

Representative specimens examined. PERU. Amazonas: Prov. Bagua, Dtto. Imaza, Comunidad Aguarana de Putuim (CAMPOU), anexo Yamayakat, Monte Alto de Putuim, 450 m, 25 Aug 1994 (fl bud), C. Diaz et al. 7007 (BRIT, HUT, MO, USM); Quebrada Chichijana Entsa, Río Cenepa, 130 m, 7 Jun 1973 (fr), E. Ancuash 580 (AMAZ, MO, NY); Vicinity Huampami, 5 km E of Valdivia, 04° 30' S, 73° 30' W, 200–500 m, 12 Aug 1978 (fr), E. Ancuash 1437 (AMAZ, BRIT, MO, NY, US). Loreto: Maquisapa, Upper Río Nanay, Jul 1929 (fr), L.J. Williams 1182 (F); Prov. Maynas, Dtto. Sta. María de Nanay, Casería Mishana, halfway between Iquitos and Sta. María de Nanay, 03° 50' S, 73° 30' W, 130 m, 25 Feb 1979 (ster.), A. Gentry & J. Aronson 25044 (AMAZ, MO); Dtto. Las Amazonas, Quebrada Yanamono, Explornapo Tourist Camp, above mouth of Río Napo on Río Amazonas, 9 Nov 1979 (ster.), A. Gentry et al. 27952 (AMAZ, MO), 25 km NE of Iquitos, along Río Amazonas, southern perimeter path, 110 m, 27 Sep 1990 (ster.), J. Pipoly et al. 12497 (AMAZ, BRIT, MO, US, USM), 03° 20' S, 72° 55' W, 100–140 m, 15 Feb 1991 (ster.), J. Pipoly et al. 13028 (AMAZ, BRIT, MO, USM), 03° 28' S, 72° 50' W, 106 m, 15 May 1989 (ster.), R. Vásquez et al. 12108 (AMAZ, MO, USM); Explornapo Tourist Camp, near Sucusari, along Río Napo, 03° 20' S, 72° 55' W, 100–140 m, 22 Feb 1991 (ster.), J. Pipoly et al. 13284 (AMAZ, BRIT, MO, USM), 23 Feb 1991 (ster.), J. Pipoly et al. 13423 (AMAZ, BRIT, MO), (ster.), J. Pipoly et al. 13426 (AMAZ, BRIT, MO, USM), 1 Mar 1991 (ster.), J. Pipoly et al. 13931 (AMAZ, BRIT, MO, USM).

*Cybianthus gigantophyllus* is most closely related to *C. occigranatensis* (Cuatrec.) G. Agostini and *C. spicigeri* Pipoly. However, the large, flat leaves, long petioles, and tortuous panicles allow for easy recognition. In the original description (Pipoly 1991), I described the pistillate corolla as tubular, when it is, in fact, campanulate. When the flower is in bud, the corolla appears tubular as it longitudinally extends above the calyx, then it gradually opens, with cucullate apices. Within the tall *terra firme* forests on lateritic soils, it may be found above the flood line along small creekbeds.

### 3. *Cybianthus occigranatensis* (Cuatrec.) G. Agostini, Acta Biol. Venez.

10:155. 1980. *Conomorpha occigranatensis* Cuatrec., Revista Acad. Colomb. Ci. Exact. 8(31):320. 1951. TYPE: COLOMBIA. VALLE DEL CAUCA: Cordillera Occidental, W slope, Río Dagua River Basin, left bank of Río San Juan, around Queremal region, small stream at km 51, 1,540–1,650 m, (stam. fl), J. Cuatrecasas 23734 (HOLOTYPE: F; ISOTYPE: COL).

Shrub or small tree to 4 m tall. Branchlets straight, subterete, 2–3 mm diam., densely lepidote. Leaves alternate; blades membranaceous, elliptic to obovate, (4)–7.5–14(–21) cm long, (2.5)–4–5(–7) cm wide, apically acuminate, the acumen 1.2–1.5(–3.0) cm long, basally acute, decurrent on the petiole, the midrib impressed above, prominently raised below, the secondary veins 8–12 pairs, deeply impressed above, prominently raised below, the leaf strongly bullate, adaxial surface smooth, densely lepidote when young, becoming pusticulate and sparsely lepidote or glabrous with age, abaxial surface densely lepidote, but the scales not overlapping; petioles canaliculate, 1.0–1.5(–1.8) cm long, densely lepidote, persistent. Staminate inflorescence a raceme or a panicle with 1–3 branches from the base, 4–8 cm long; peduncle, rachis,

branches and pedicels densely lepidote; peduncle 0.1–0.4 mm long; floral bracts membranaceous, ovate, shorter than the pedicels, 0.7–1.1 mm long; 0.4–0.5 mm wide, apically acute, densely lepidote abaxially, the margin entire; pedicels cylindric, thin, 1.5–6 mm long. *Staminate flowers* 4-merous; calyx carnose, cotyliform, 0.8–1.0 mm long, the tube 0.2–0.3 mm long, the lobes triangular to deltate, 0.5–0.9 mm long, 0.4–0.8 mm wide, apically attenuate to an acute or round tip, sparsely lepidote without, glabrous within, conspicuously brown punctate, the margin lepidote; corolla membranaceous, campanulate, 2.4–2.7 mm long, the tube 0.7–0.8 mm long, the lobes ovate, 1.6–1.8 mm long, 1.0–1.3 mm wide, apically attenuate to a round tip, verruculose without, smooth within, sparsely lepidote without toward apex, apically glandular-granulose within and along margins, conspicuously brown punctate, the margins entire; stamens 1.8–1.9 mm long, the filaments 2.6–2.8 mm long, the tube membranaceous, inconspicuous, adnate to the corolla tube, elobate, the apically free portions 0.2–0.3 mm long, the anthers triangular, 0.8–1.0 mm long, 0.5–0.6 mm wide, apically attenuate to an acute, dorsally reflexed tip, basally cordate, dorsifixated just above base, the connective dark, prominently brown punctate; pistillode lageniform, 1.3–1.5 mm long, densely translucent glandular-lepidote near the base. *Bisexual and pistillate inflorescence*: as in staminate but only rarely branched from base, 4–6 cm long; peduncle 0.1–0.3 cm long; floral bracts 0.5–0.8 mm long; pedicels 1.5–3.5 mm long. *Bisexual and pistillate flowers* as in staminate but calyx 0.8–1.1 mm long, the tube 0.3–0.6 mm long, the lobes deltate to oblate, 0.4–0.6 mm long, 0.8–1 mm wide; the margin irregular, entire; corolla as in staminate but 2.4–2.6 mm long, the tube 1.0–1.1 mm long, the lobes ovate, 1.4–1.6 mm long, 0.8–1.1 mm wide. *Bisexual flowers* with stamens 1.6–1.8 mm long, the tube 1.0–1.2 mm long, the apically free portions of filaments 0.2–0.3 mm long, the anthers 0.5–0.8 mm long, pistillode 1.5–1.8 mm long. *Pistillate flowers* with staminodes 1.6–1.8 mm long, the tube 1.0–1.2 mm long, the apically free portion of filaments 0.1–0.2 mm long, the antherodes 0.5–0.7 mm long; pistil obovate, 2.4–2.6 mm long, the ovary 1.1–1.2 mm long, 1.1–1.2 mm diam., the style 1.0 mm long, the stigma capitate, 2-lobed, to 0.2 mm long, the ovules 2–4, buried in the placenta below apical pores. *Fruit* globose, 2.5–4 mm long, 3.5–4.5 mm diam., the endocarp smooth, the aril scanty and adnate to both seed and endocarp, the embryo straight, ca. 3 mm long.

*Distribution*.—Panama (Darién), Colombia (Cordillera Occidental) and Ecuador (Esmeralda, Napo, Santiago-Zamora, Sucumbíos), at 1,000–1,960 m elevation.

*Ecology and conservation status*.—*Cybianthus occigranatus* occurs in premontane pluvial forests, subpáramo thickets and in upper pluvial cloud forests. Based on my observations of populations in subpáramo thickets at the Antioquia/

Chocó interface in the Cordillera Occidental of Colombia, this species tolerates disturbance well as long as the soil is not compacted. It is restricted to areas where rainfall exceeds 5,000 mm annually. At this time, the species does not seem to be threatened.

**Etymology.**—The specific epithet refers to its principal range of distribution, the Cordillera Occidental of Colombia and adjacent Ecuador.

Specimens examined. PANAMA. Darién: S slope of westernmost summit of Cerro Tacaracuna, massif between Pucro base camp and Tacaracuna summit camp, 1,400–1,600 m, 21 Jul 1976 (stam. fl), A. Gentry et al. 16867 (COL, LL-TEX, MO, PMA). COLOMBIA. Antioquia: Mpio. Frontino, km 13 Nutibara-La Blanquita Rd., Región de Murrí, Alto de Cuevas, 06° 44' N, 76° 23' W, 1,990 m, 6 Nov 1988 (fl bud), J. Zarucchi et al. 7201 (BRIT, HUA, MO); Mpio. Frontino, Vereda Venados, Parque Nacional Las Orquídeas, sector Dos Bocas, confluence of Río Venados and Río Calles, 06° 34' N, 76° 30' W, 29 Oct 1986 (stam. fl), R. Callejas et al. 2737 (HUA, MO); Mpio. San Luis, Autopista Medellín-Santafé de Bogotá, sector Río Samaná, Rd. toward Vereda La Josefina, 18 Dec 1982 (stam. fl), A. Cogollo & C. Estrada 296 (COL, JAUM, MO); Mpio. Urrao, Parque Nacional Las Orquídeas, Vereda Calles, Permanent Premontane Rainforest Inventory Plot, right bank of Río Calles, 06° 32' N, 76° 19' W, 1,450 m, 26 Nov 1993 (ster.), J. Pipoly, A. Cogollo et al. 17159 (BRIT, JAUM, MO), 27 Nov 1993 (ster.), J. Pipoly, A. Cogollo et al. 17182 (BRIT, JAUM, MO), Range NW of Cabaña de Calles, 1,450 m, 28 Nov 1993 (ster.), A. Cogollo et al. 7529 (BRIT, JAUM, MO), 1,450–1,500 m, 28 Nov 1993 (ster.), J. Pipoly et al. 17253 (BRIT, JAUM, MO), (ster.), J. Pipoly et al. 17281 (BRIT, JAUM, MO), 7 Dec 1993 (ster.), J. Pipoly et al. 17871 (BRIT, JAUM, MO), 9 Dec 1993 (fl. bud), J. Pipoly et al. 17979 (BRIT, JAUM, MO), Vereda Calles, Alto de Palmitas, ca. 1 km from Cabaña de Calles, 1,700–1,750 m, 2 Dec 1993 (ster.), J. Pipoly et al. 17542 (BRIT, JAUM, MO). Chocó: Mpio. Itsmina, Quebrada Raspadura, between Raspadura and Quibdó, split of Río Atrato and Río San Juan drainage basins, ca. 05° 15' N, 76° 38' W, 18 Apr 1979 (fr), E. Forero & R. Jaramillo 5307 (COL, MO); Serranía del Darién, along Colombian/Panamanian border, 1,400 m, 20 Jul 1976 (stam. fl, bisex. fl), A. Gentry, H. León & L. Forero 16842 (COL, MO); without locality, 1866 (fr), J. Triana 2589 (G). Huila: Río Suaza, SW of Alejandría, 1,670 m, 23 Aug 1944 (stam. fl), E. Little 8532 (COL, US). Quindío: Mariquita, 1866 (stam. fl), J. Triana 2562 (P). Valle Del Cauca: Cordillera Central, 5 km N of Darién along Rd. toward La Guajira, Upper Río Calima, 03° 58' N, 76° 28' W, 1,550–1,700 m, 24 Jan 1986 (fl bud), B. Stein & L. McDade 3284 (BRIT, HUA, MO); Finca Zungara, Corregimiento La Divisora, crest of Cordillera Occidental, W of Cali, 6 km N of Cali-Buenaventura Hwy, 03° 32' N, 76° 35' W, 1,960 m, 12 Dec 1985 (ster.), A. Gentry et al. 53167 (COL, MO, US), 24 Mar 1986 (fr), A. Gentry et al. 53551 (COL, MO, US); Río Diguia Drainage Basin, Piedra de Moler, 900–1,180 m, 20 Oct 1943 (pist. fl, fr), J. Cuatrecasas 1918 (COL-2 sheets, F); Río Sanquininí, La Laguna, 1,250–1,400 m, 10 Dec 1943 (stam. fl), J. Cuatrecasas 15658 (COL, F, US); Monte La Guardia, La Carbonera Range, between Las Brisas and Albán, 1,950–2,000 m, 16 Oct 1946 (stam. fl), J. Cuatrecasas 22131 (COL, F, US, VEN); San Antonio, W of Cali, 1,900–2,350 m, 26 Feb 1939 (stam. fl), E. Killip & A. García 33898 (A, BM, COL, F, NY, US); La Cumbre, 7 May 1922 (stam. fl), E. Pennell 5147 (GH, K, NY, US). ECUADOR. Esmeraldas: San Lorenzo Cantón, Reserva Étnica Awá, Parroquia Alto Tambo, Centro de la Unión, Cañón del Río Mira, 00° 52' N, 78° 26' W, 250 m, 22 Mar 1993 (fr), C. & M. Aulestia 1313 (BRIT, MO, QCNE). Napo: Carretera Nueva, Cotundo-Coca, 1,130 m, 5 Aug 1984 (pist. fl, fr), C. Dodson et al. 15115 (MO); Cantón Archidona, 150 m NE of Caserío de Huamán, right side of Carretera Hollín-Loreto, 00° 43' S, 77° 36' W, 1,200 m, 9 Sep 1988 (fr), F. Hurtado & D. Neill 235 (MO, QCNE). Cordillera de Guacamayos, Rd. to Archidona, Río

Hollín Pequeño, primary forest on 90° slopes, 00° 38' S, 77° 48' W, 1,900 m, Aug 1990 (stam. fl), *W. Palacios & E. Freire* 4899 (BRIT, MO, QCA); Cantón El Chaco, Right margin of Río Quijos, Finca "La Ave Brava," of Segundo Pacheco, 00° 12' S, 77° 39' W, 1,800–1,900 m, 7–10 Sep 1990 (fr), *W. Palacios* 5394 (BRIT, MO, QCNE); Slope of Volcán Reventador, left bank of Río Reventador, between Rd. and trail to crater, 00° 07' S, 77° 36' W, 1,600–1,850 m, 11 Oct 1990 (stam. fl), *W. Palacios* 6176 (BRIT, MO, QCNE), (stam. fl), *W. Palacios* 6187 (BRIT, MO, QCNE), (fr), *W. Palacios* 6218 (BRIT, MO, QCNE); Proyecto Hidroeléctrico Coca, Punto ST4; tight margin of Río Quijos, ca. 10 km S of Reventador, 00° 11' S, 77° 39' W, 1,500 m, 3–5 Oct 1990 (pist. fl), *W. Palacios* 5815 (BRIT, MO, QCNE), 08° 08' S, 77° 30' W, 1,450 m, 6–10 Oct 1990 (pist. fl), *W. Palacios* 6040 (BRIT, MO, QCNE); Yasuní National Park, Maxus Rd and pipeline construction project, km 15, 00° 31' S, 76° 32' W, 250 m, 30 Jun 1994 (bud) *N. Pitman*-461 (BRIT, MO). Santiago-Zamora: Between Campanas and Arenillas, along Río Tintas, 10 leagues SE of El Pan, 2,195 m, 13 Jul 1943 (stam. fl), *J. Steyermark* 53550 (NY). Sucumbíos: Sendero toward Volcán el Reventador from km 100 of Baeza-Lago Agrio Hwy, 1,900 m, 7 Oct 1990 (stam. fl), *J. Jaramillo & E. Grijalva* 12988 (QCA).

*Cybianthus occigranatensis* is most closely related to *C. timanae* Pipoly, but is easily distinguished by the fewer secondary veins of the coriaceous leaf blades, the campanulate corolla with verrucose, prominently black punctate lobes and attenuate apices, and obnapiform pistil. The population from Alto de Cuevas in Antioquia, Colombia, has by far the largest leaves of any population of this species known thus far. Further study of the population biologies of *Cybianthus montanus* (Lundell) G. Agostini from Panama, *C. occigranatensis*, and *C. timanae* will be necessary to fully resolve the precise relationships and microecological roles each plays in montane wet and pluvial forests.

#### 4. *Cybianthus spichigeri* Pipoly, Candollea 46:43. 1991. (Fig. 2B, 11).

TYPE: PERU. LORETO: Prov. Requena, Trocha al Ajual, 2 km from Centro Forestal Jenaro Jerrera, right bank of Río Ucayali, 15 Feb 1982 (stam. fl, fr), *R. Spichiger & F. Encarnación* 1224 (HOLOTYPE: US; ISOTYPES: AMAZ, G, MO).

*Tree to 15 m tall. Branchlets thin, straight, terete, 2–3 mm diam., densely lepidote. Leaves alternate; blades chartaceous, elliptic to narrowly oblanceolate, (10–)15–20 cm long, (3–)5.2–6.5(–7.2) cm wide, apically caudate-acuminate, the acumen 1.9–2.3 cm long, basally acutish to obtuse, not decurrent on the petiole, bullate, the midrib and secondary veins strongly impressed above, prominently raised below, smooth and inconspicuously to prominently pellucid punctate above, moderately lepidote below, the margin essentially flat, but very slightly inrolled at the very margin; petioles canaliculate, (1–) 1.2–2 cm long, densely lepidote. Staminate inflorescence: a pyramidal pinnate panicle, 1–4.5 cm long, 1–3 cm wide, peduncle 0.3–1 cm long; branch bracts chartaceous, linear-subulate, 0.6–1 mm long, 0.1–0.2 mm wide, apically attenuate, densely lepidote; pedicels cylindrical, (0.8–)1–1.5 mm long. Staminate flowers 4–5-merous, carnose; calyx suburceolate, 1.3–1.5 mm long, the tube 0.3–0.5 mm long, the lobes deltate, ca. 1 mm long and wide, apically acute,*

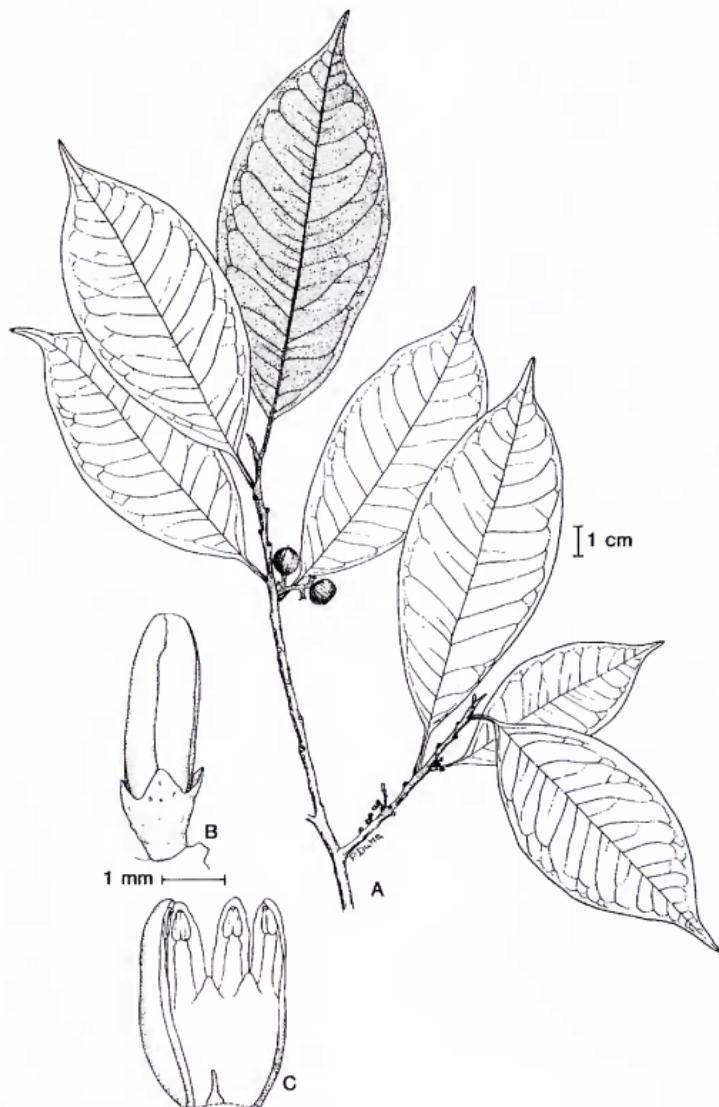


FIG. 11. *Cybianthus spichigeri* Pipoly. A. Habit, showing minute inflorescences and large, costate fruits. B. Staminate flower in bud, showing subulate calyx and tubiform corolla. C. Staminate flower, showing long, prominently lobate staminal tube, cucullate corolla lobes, proximally recurved anthers. A–C, drawn from holotype, by Peggy Duke. Figure reproduced from Pipoly, 1991.

sparingly lepidote, prominently rugose, with one prominent brown punctuation per lobe, the margins irregular, entire, sparsely lepidote; corolla tubiform, 2.4–2.8 mm long, the tube ca. 0.5 mm long, the lobes oblong, 1.9–2.9 mm long, 0.9–1.1 mm wide, apically acute, prominently cucullate, with only a few, scattered scales without, glandular-granulose within, the margin entire, glandular-granulose; stamens 2.2–2.4 mm long, the tube carnose, conspicuous, 1–1.4 mm long, lobate, the lobes 0.1–0.2 mm long alternating with the filaments, the apex of the tube and lobes punctate, the apically free filaments, 0.9–1.3 mm long, the anthers deltate, 0.5–0.7 mm long and wide, apically apiculate, the apiculum slightly proximally recurved, basally cordate, the connective dorsally punctate with small brown dots forming a triangle along connective margin; pistillode conic, 0.5–0.7 mm long, 0.2–0.3 mm wide, hollow, glabrous, the style conspicuously brown punctate, the stigma punctiform. *Pistillate and polygamous inflorescence:* a raceme, occasionally a poorly formed panicle of 1–3 racemes branched from base, 0.4–1.5 cm long, densely lepidote, tardily glabrescent; peduncle 0.1–0.4 mm long; floral bracts chartaceous, ovate, 0.8–1 mm long, 0.3–0.5 mm wide, apically attenuate, densely lepidote; pedicels obconic, (0.8)–1.5–2.5(–3) mm long, to 1.2 mm diam. apically in fruit, densely lepidote. *Pistillate flowers* as in staminate but calyx 1.0–1.2 mm long, the tube 0.4–0.5 mm long, the lobes 0.6–0.7 mm long and wide, staminodes and pistil unknown. *Fruit* depressed-globose, 0.7–0.8 cm long, 0.7–1.5 cm wide, prominently costate longitudinally, the exocarp costate, inconspicuously pellucid punctate.

*Distribution.*—Principally known from forests along the ríos Ucayali, Marañón and Napo Drainage Basin complex, Loreto, Peru, with one disjunct population in nearby Morona-Santiago, Ecuador, 150–180 (–1,500) m elevation.

*Ecology and conservation status.*—*Cybianthus spichigeri* is known from only a handful of specimens, but is locally quite common. Not enough is known of the population biology to categorize its conservation status, but its frequency in forest study plots of the Jenaro Herrera Reserve in Peru suggest it is reproducing and may not be in imminent danger. *Cybianthus spichigeri* is a varillal or premontante sandstone species in Peru, and in Ecuador it is known only from premontane sandstones. Occurrence of this species in the Cerros del Sirá, Peru, reinforces the concept that those mountains contain many unusual populations of otherwise lowland Amazonian plants.

*Etymology.*—The epithet commemorates Rudolphe Spichiger, Director of the Conservatoire et Jardin Botaniques, Chambésy, Geneve, Switzerland. Dr. Spichiger has devoted much of his career to study of global change, conservation of biodiversity, and systematics of the genus *Ilex*. Under his leadership, the Jardin has maintained active research programs in Paraguay, Peru, Madagascar, and throughout Europe.

Representative specimens examined. ECUADOR. Morona-Santiago: Cordillera del C\'ordor, Cuangos, 20 km E of Gualaqueza, near disputed Peru-Ecuador border, 03° 29' S, 78° 14' W, 1,500 m, 18 Jul 1993 (ster.), *A. Gentry* 80096 (BRIT, MO, QCNE), 1,470 m, 19 Jul 1993 (infl. bud), *A. Gentry* 80179 (BRIT, MO, QCNE). PERU. Hu\'anuco: Prov. Pachitea, region of Pucallpa, W part of "Sir\'a Mountains," and adjacent lowland, ca. 24 km SE to 26 km ESE of Puerto Inca, from beginning of rainforest to Campamento Pato Rojo, 09° 27' S, 74° 46' W, 1,380 m, 31 Jan 1988 (fl bud), *W. Morawetz & B. Walln\"ofen* 14-31188 (BRIT, W, WU). Loreto: Prov. Maynas, Allpahuayo, IIAP Station, 04°10' S, 73°30' W, 150 m, 13 Nov 1984 (fr), *R. V\'asquez et al.* 5911 (AMAZ, MO, NY), 6 Jun 1985 (fr), *R. V\'asquez et al.* 6588 (AMAZ, MO, NY); R\'io Nanay, Mishana, 30 km SW of Iquitos, 03° 55' S, 73° 35' W, 150 m, 19 Aug 1978 (fr), *R. Foster* 4226 (MO, NY, USM), 16 May 1981 (fr), *R. V\'asquez & J. Criollo* 1801 (AMAZ, MO, NY), 20 Jan 1985 (fr), *R. V\'asquez & N. Jaramillo* 6137 (AMAZ, MO, NY). Prov. Requena, Reserva Forestal Jenaro Herrera, 04°55' S, 73°45' W, along R\'io Ucayali, 120 m, 1980 (stam. fl), *R. Marmillod* 9-R-137 (G, US), 1980 (bud), *R. Marmillod* 4-R-90, 10 Jun. 1982 (fr), *R. Spichiger et al.* 1973 (G, US), 24 Feb. 1987 (ster.), *A. Gentry et al.* 56531 (AMAZ, MO); Aguajal, 3 km from Centro Forestal Jenaro Herrera, right margin R\'io Ucayali, 18 May 1982 (fr), *F. Encarnaci\'on* 26105 (AMAZ, MO), 22 May 1982 (fr), *F. Encarnaci\'on* 26200 (AMAZ, MO, NY, US); Arboretum, Centro Forestal Jenaro Herrera, 180 m, 13 Nov 1981 (fr, stam. fl), *R. Spichiger & F. Encarnaci\'on* 1027 (AMAZ, G, MO, US).

*Cybianthus spichigeri* is unique within subgenus *Conomorpha* because of its costate fruits. In addition, the subbullate leaf blades, punctate staminal tube, obconic pedicels, and polygamous inflorescences are also exceedingly rare characters that allow for easy recognition. Since its description (Pipoly 1991), an entirely staminate specimen (*R. Marmillod* 9-R-137) has been located. While the staminate inflorescence structure is quite different from that of the polygamous one, flowers of both are identical. The occurrence of this taxon three times in one inventory conducted at the Jenaro Herrera Reserve indicate that the relative frequency of reproductive individuals would permit a study of the breeding system and population biology for this most unusual taxon.

##### 5. *Cybianthus lepidotus* (Gleason) G. Agostini, Bol. Soc. Venez. Ci. Nat. 22:388. 1976. *Conomorpha lepidota* Gleason, Bull. Torrey Bot. Club 58:446. 1931.

TYPE: VENEZUELA. TERRITORIO FEDERAL AMAZONAS: Summit of Mt. Duida, 1,500 m, Aug 1928-Mar 1929 (pist. fl), *G. H. H. Tate* 741 (HOLOTYPE: NY, F Neg. 040832; ISOTYPE: US).

*Conomorpha curvivenia* Gleason, Bull. Torrey Bot. Club 58:444. 1931. TYPE: VENEZUELA. TERRITORIO FEDERAL AMAZONAS: Mt. Duida, 1,260 m, Aug 1928-Mar 1929 (stam. fl), *G. H. Tate* 927 (HOLOTYPE: NY; ISOTYPE: US).

*Conomorpha lepidota* Gleason f. *acutata* Steyermark., Fieldiana, Bot. 28:465. 1953. TYPE: VENEZUELA. TERRITORIO FEDERAL AMAZONAS: Cerro Duida, 2 Dec 1944 (fr), *J. Steyermark* 58265 (HOLOTYPE: F; ISOTYPE: NY).

*Shrub or small tree* to 6 m tall. *Branchlets* straight, terete, 2-2.5 mm diam., densely lepidote. *Leaves* alternate; blades elliptic to narrowly elliptic, chartaceous to coriaceous, (3.1)-5-15 cm long, 1.6-6 cm wide, apically acuminate, the

acumen 0.3–2.0 cm long, basally acute to obtuse, midrib depressed above, prominently raised below, the secondary veins 24–28, inconspicuous above and below, pustulate and densely lepidote above at first, glabrescent, densely lepidote below, the scales not overlapping, inconspicuously pellucid punctate, the margin entire, subrevolute to revolute; petioles thin, marginate, 1.0–2.5 cm long, densely lepidote. *Staminate inflorescence* a spike, rarely two subsessile spikes, (2–)6–16 cm long, 8–15-flowered, peduncle, pedicels, and axis densely lepidote, the scales not overlapping; peduncle (0.2–)0.5–0.8 mm long; floral bracts ovate to widely ovate, chartaceous, 0.5–0.6 mm long, 0.3–0.4 mm wide, apically acute, densely lepidote adaxially, the margin entire, glabrous. *Staminate flowers* (4–)5-merous; calyx cupuliform, carnose, 0.9–1.2 mm long, the tube 0.2–0.4 mm long, the lobes deltate to ovate-triangular, 0.6–0.8 mm long and wide, apically acute or acuminate, rarely obtuse, attenuate to a rounded tip, conspicuously brown punctate, the margin entire, lepidote; corolla cupuliform, carnose, 1.5–2.5 mm long, the tube 0.5–1.0 mm long, the lobes ovate to broadly ovate, 1.2–1.7 mm long, 0.7–0.9 mm wide, apically attenuate to a round, cucullate tip, at times with a few, scattered lepidote scales without, glabrous without, glandular-granulose within over the entire surface, punctations brown, submarginal, the margin entire, glabrous; stamens 1.5–1.6 mm long, adnate 0.5–1.0 mm to corolla tube, the staminal tube 0.3–0.4 mm long, carnose, bearing lobes alternating with the apically free portions of the filaments 0.1–0.2 mm long, the filaments flat, 0.3–0.4 mm long, erect, glabrous, the anthers dorsifixed less than 1/4 from base, ovate-triangular, 0.6–0.7 mm long, 0.4–0.5 mm wide, apically attenuate to a rounded tip, basally cordate, slightly dorsally reflexed, the connective epunctate; pistillode lageniform, 1.1–1.2 mm long, hollow, costate basally, sparingly translucent lepidote, pellucid-punctate. *Pistillate inflorescence* as in staminate but a spike, (2–)6–16 cm long, 6–10-flowered; peduncle 0.6–0.8 mm long; floral bracts 0.5–0.6 mm long, 0.3–0.4 mm wide. *Pistillate flowers* as in staminate, but staminodes 1.2–1.3 mm long, adnate 0.5–1.0 mm to corolla tube, the staminodial tube 0.5–0.6 mm long, carnose, bearing lobes alternating with the apically free portions of the filaments 0.1–0.2 mm long, those apical portions flat, 0.3–0.4 mm long, erect, glabrous, the antherodes dorsifixed less than 1/4 from base, deltate, 0.7–0.8 mm long and wide, apically attenuate to a rounded tip, basally cordate, slightly dorsally reflexed, the connective epunctate; pistil pyriform, 1.4–1.5 mm long, the ovary 1–1.2 diam., the style not differentiated, the stigma punctiform, the placenta patelliform, bearing 2(–3) naked ovules. *Fruit* globose, purple at maturity, 0.5–1.0 cm long, 0.6–1.0 cm diam., the endocarp smooth, the embryo curved, 3.5–4.0 mm long.

*Distribution.*—Guayana Highland of Venezuela and Brazil, and sandstone

formations in Bolivia and Peru (reported for the first time here), 600–2,300 m in Venezuela, 850–950 m in Bolivia, and 760–850 m in Peru.

*Ecology and conservation status.*—*Cybianthus lepidotus* is restricted to large cloud forest formations in transition zones between sandstone and diabasic intrusions. It is often associated with species of *Erythroxylum*, which are also edaphic endemics. It is a widespread, but locally infrequent species and therefore, should be considered threatened.

*Etymology.*—The epithet refers to the densely lepidote vestiture of the vegetative and floral parts of the plant.

Specimens examined. PERU. AMAZONAS: Prov. Bagua, Dtto. Imaza, Comunidad Aguaruna Putum, anexo Yamayakat, SW of Putuim, 760–850 m, 26 Sep 1994 (stam. fl.), C. Díaz et al. 7252 (BRIT, HUT, MO, USM). BOLIVIA. LA PAZ: Prov. Nor Yungas, valley of Río Coroico, Sacramento, 10 km NE of Chuspipata on Coroico Rd., 27 Jan 1984 (ster.), A. Gentry & J. Solomon 44668 (MO), 4 km NE (above) Inabuara, 13.5 km above San Pedro, 1,530–1,560 m, 22 Jan 1984 (stam. fl.), A. Gentry & J. Solomon 44407 (MO); Prov. Larecaja, Maipiri, 6 Nov 1926–28 Feb 1927 (stam. fl.), O. Buchen 1758 (HBG, NY, US), Copacabana, 10 km S of Maipiri, 850–950 m, 8 Oct–15 Nov 1939 (fr.), B. Kruckoff 10987 (A, K, MICH, MO, NY, UC, US).

*Cybianthus lepidotus*, restricted to sizeable cloud forests in transition zones between sandstone and diabasic intrusions, is most easily recognized by its long, lax spikes. When sterile, it may be confused with *Cybianthus roraimae* (Steyermark) G. Agost., but may be easily distinguished by the branchlets 2–2.5 (not 3.5–4.5) mm in diameter. It may also be confused with *Cybianthus punctatus* (Mez) G. Agost. and *C. cardonae* G. Agost. For a discussion of the differences between these taxa in sterile condition, see Pipoly (1992a).

The area of Bolivia in which this species has been collected is of biogeographic interest because it also supports several other Guayana Highland taxa in the Ericaceae and Clusiaceae. Its new discovery in Bagua Province of Amazonas, Peru, reinforces thematic map data from satellite imagery that indicated tepuí-like vegetation could be expected in the area. It is interesting that *C. Díaz et al.* 7252 from Peru, and *B. Kruckoff* 10987 from Bolivia, are qualitatively and quantitatively identical to specimens of *Cybianthus lepidotus* from Cerro Duida, Amazonas, Venezuela.

###### 6. *Cybianthus laetus* (Mez) G. Agostini (Fig. 2C), Acta Biol. Venez. 10:153.

1980. *Conomorpha laeta* Mez in Engl., Pflanzenr. IV. 236(Heft 9):259. 1902. TYPE: PERU. AMAZONAS: Taulia, without elevation or date (stam. fl.), A. Matthews 1561 (HOLOTYPE: K; ISOTYPE: K).

*Shrub or small tree to 2 m tall. Branchlets straight, subterete, 2–3 mm diam., densely lepidote. Leaves alternate; blades coriaceous, obovate, 3–8(–12) cm long, 1.2–2(–5.0) cm wide, apically acute or short-acuminate, basally cuneate, decurrent on the petiole, midrib depressed above, prominently raised below, the secondary veins 14–18 pairs, planar above, conspicuous below,*

glabrous and smooth above at maturity, densely lepidote below, the margin revolute; petioles marginate, 0.5–1 cm long, densely lepidote. *Staminate inflorescence*: a raceme or panicle with 2 racemose branches from base, 2–3 cm long; rachis, and pedicels densely lepidote; peduncle 0.1–0.3 cm long; pedicels cylindrical, 0.9–1.5 mm long; floral bracts chartaceous, narrowly ovate, 1–2 mm long, densely lepidote adaxially. *Staminate flowers* 4-merous; calyx carnose, cotyliform, 1.2–1.8 mm long, sparsely to densely lepidote without, glabrous within, the tube 0.2–0.3 mm long, the lobes triangular to deltate, 0.8–1 mm long, 0.6–0.8 mm wide, apically attenuate to a rounded tip, inconspicuously pellucid punctate, the margin entire, lepidote; corolla carnose, campanulate, 3.2–3.4 mm long, the tube 1.8–2 mm long, densely lepidote without, the scales overlapping, glabrous within, the lobes ovate or ovate-triangular, 0.8–0.9 mm long, 0.3–0.4 mm wide, symmetric, apically attenuate to a rounded tip, inconspicuously pellucid punctate, densely lepidote without, glandular-granulose within, the margin entire, glandular-granulose; stamens 2.6–2.7 mm long, the tube carbose, conspicuous, equalling the corolla tube, 1.8–2 mm long, lobate, the lobes alternating with the filaments ca. 0.1 mm long, the apically free portions of the filaments flat, 0.1–0.2 mm long, the anthers dorsifixed, ovate, 0.6–0.9 mm long, 1.8–1.9 mm wide, somewhat curved distally, apically apiculate to subapiculate, basally cordate, the connective inconspicuously brown punctate; pistillode conic, 1.5–2 mm long, translucent glandular-lepidote basally, hollow. *Pistillate inflorescence*: as in staminate but 3–3.5 cm long; peduncle 0.1–0.4 cm long; pedicels cylindrical, 0.9–1.5 mm long; floral bracts chartaceous, linear-lanceolate, 1.3–1.5 mm long, densely lepidote adaxially. *Pistillate flowers* as in staminate but calyx 1.2–1.4 mm long, sparsely to densely lepidote without, glabrous within, the tube ca. 0.2 mm long, the lobes deltate, 1–1.2 mm long and wide, apically attenuate to a rounded tip, inconspicuously pellucid punctate, the margin entire, lepidote; corolla, staminodes and pistil unknown. *Fruit* globose, 5–8 mm long and in diam., exocarp carbose, black.

*Distribution*.—Eastern slopes of the Andes, Colombia, Peru and Bolivia, 1,980–2,850 m.

*Ecology and conservation status*.—The species occurs in primary cloud forest, a life zone being cleared rapidly for cultivation throughout the Andes, which may account for the paucity of collections. Within subgenus *Conomorpha*, *Cybianthus laetus* is the species most in danger of extinction.

*Etymology*.—The specific epithet is Latin for “cheerful or bright,” and probably refers to the plant’s aesthetically pleasing appearance, having the same general form as many species of *Vaccinium*, *Myrsine dependens*, other Ericaceae, and other diminutive Andean shrubs. The thick juicy exocarp is said to be very tasty although slightly acidic (T. Dudley, pers. comm.).

Representative specimens examined. COLOMBIA. Boyaca: Arcabuco, NE of town, 2,650 m, 11 Nov 1965 (stam. fl), *L. Uribe s.n.* (COL); Sierra Nevada del Cocuy, path from Laguna to Cobugón, near Alto del Oso, 2,900 m, 27 Aug 1958 (stam. fl), *P. Grubb et al.* 744 (K). PERU. Amazonas: Prov. Luya, Drto. Camporredondo, Anexo Tullanya, between Pájaco Tigre and Palma,  $06^{\circ} 04' 35''$  S,  $78^{\circ} 21' 45''$  W, 2,500–2,600 m, 9 Dec 1996 (fr), *J. Campos et al.* 3161 (BRIT, HUT, MO, USM); Along Rd. E of Chachapoyas between Pipos and Molinopampa,  $06^{\circ} 15'$  S,  $77^{\circ} 40'$  W, 1,980–2,340 m, 14 Feb 1985 (pist. fl, fr), *J. Luteyn & E. Cotton* 11414 (NY, TEX, US, USM); E of Chachapoyas, 2,000 m, without date (stam. fl), *A. Weberbauer* 4354 (G). Cusco: Prov. La Convención, Cordillera Vilcabamba,  $12^{\circ} 37'$  S,  $73^{\circ} 32'$  W, ceja and cumbre, 2,550 m, 3 Jul 1968 (pist. bud), *T. Dudley* 10690 (F, NA, USM), 5 Jul 1968 (pist. fl, fr), *T. Dudley* 10803 (F, NA, USM). Huánuco: Prov. Huánuco, Caripish Hills, trail to summit from W entrance, 2,700–2,850 m,  $09^{\circ} 42'$  S,  $76^{\circ} 05'$  W, 2 Mar 1985 (stam. fl.), *B. Stein & C. Todzia* 2292 (MO, USM).

*Cybianthus laetus* is easily recognized by its small leaves, short petioles, subsessile anthers and thick, juicy exocarp. It is known outside of Peru from only two other collections, one from the department of Boyacá, Colombia and the other from Nor Yungas, Bolivia. A recent collection from Luya Province in western Peru (*J. Campos et al.* 3161) is referred here because of its thin, angulate branchlets, and the thick exocarp of its fruits, despite the larger, thinner leaves. It is expected in Ecuador, in either Napo or Santiago-Zamora Provinces.

7. *Cybianthus peruvianus* (A. DC.) Miq. (Fig. 2D) in Mart., Fl. Bras. 10:298. 1856. *Conomorpha peruviana* A. DC., Ann. Sci. Nat., Bot. ser 2, 16:92. 1841. *Peckia peruviana* (A. DC.) Kuntze, Revis. Gen. Pl. 402. 1891. Type: PERU. AMAZONAS: Moyobamba, 1838 (stam. fl), *A. Mattheus s.n.* (HOLOTYPE: G-DC; ISOTYPES: G, G-BOIS, GH, K).

*Conomorpha weberbaueri* Mez, Repert. Spec. Nov. Regni Veg. 3:101. 1906. TYPE: PERU. LORETO: In mountains near Moyobamba, 1,300 m, 28 Aug 1904 (stam. fl), *A. Weberbauer* 4668 (HOLOTYPE: B-destroyed; LECTOTYPE, here designated: F).

*Shrub or small tree to 16 m tall. Branchlets straight, terete, 3–5 mm diam., densely lepidote. Leaves alternate, at times approaching pseudoverticillate at some nodes; blades coriaceous, elliptic to obovate, 7–12.7 cm long, (2.6–) 3.5–5 cm wide, apically acuminate, the acumen 1.2–1.6 cm long, basally acute to obtuse, decurrent on the petiole, midrib depressed above, prominently raised below, the secondary veins 10–25 pairs, prominently raised below, densely lepidote at first, then pusticulate above at maturity, sparsely lepidote below, the margin revolute; petioles canaliculate, 1–1.5 cm long, densely lepidote. Staminate inflorescence: a panicle with 1–4 racemes branching from the base, (2–)3–8 cm long; peduncle, rachis and pedicels densely lepidote; peduncle 0.1–0.2 cm long; floral bracts chartaceous, ovate, 0.7–1 mm long, 0.5–0.6 mm wide, apically attenuate, densely lepidote abaxially; pedicels cylindrical, 0.5–1(–1.2) mm long. Staminate flowers 4–5-merous; calyx green, cotyliform, 0.8–1.2 mm long, lepidote without, glabrous within, the tube 0.3–0.4 mm long, the lobes ovate to deltate, 0.7–0.8 mm long,*

0.5–0.8 mm wide, apically attenuate to a rounded tip, the margin lepidote, inconspicuously brown punctate; corolla translucent green, chartaceous, campanulate, 2–2.6 mm long, the tube 0.6–1.2 mm long, glabrous or sparsely lepidote externally, glabrous internally, the lobes ovate to narrowly ovate, 1.2–1.8 mm long, 0.5–1.1 mm wide, asymmetric, apically rounded or attenuate to a rounded tip, sparsely lepidote externally, the scales not overlapping, sparsely glandular-granulose internally, inconspicuously brown punctate, the margin glandular-granulose; stamens 1.4–2 mm long, the tube chartaceous, conspicuous, longer than the corolla tube, 0.8–1.2 mm long, elobate, the apically free portions of the filaments 0.2–0.4 mm long, the anthers linear-lanceolate, 0.7–0.9 mm long, 0.2–0.3 mm wide, somewhat recurved distally, attenuate to a round or acute tip, the connective conspicuously brown punctate; pistillode obclaviform, 1–1.5 mm long, translucent glandular-lepidote basally. *Pistillate inflorescence*: like the staminate but, 2–7 cm long; peduncle 0.1–0.2 cm long; floral bracts 0.7–1 mm long, 0.4–0.5 mm wide; pedicels 0.2–0.5 mm long. *Pistillate flowers* as in staminate but calyx 0.9–1.1 mm long, the tube 0.3–0.7 mm long, the lobes deltate, 0.5–0.6 mm long, 0.4–0.5 mm wide, apically subacute to obtuse; corolla 1.3–1.7 mm long, the tube 0.2–0.3 mm long, the lobes ovate, 1–1.4 mm long, 0.7–0.9 mm wide, apically obtuse; staminodes 1–1.2 mm long, the tube longer than the corolla tube, 0.3–0.4 mm long, the apically free portions of the filaments 0.2–0.3 mm long, the antherodes 0.6–0.7 mm long, 0.2–0.3 mm wide, pistil obnapiform, 1.3–1.4 mm long, 1–1.1 mm diam., the ovary 0.6–0.7 mm long, translucent glandular-lepidote basally, the style 0.5–0.6 mm long, conspicuously brown punctate, the stigma punctiform, the placenta globose, ovules 3, apically exposed. *Fruit* subglobose, 0.3–0.8 mm long, 0.4–0.9 mm diam., the exocarp thin, black.

*Distribution*.—Amazonian Ecuador through Peru to Bolivia, at 122–1,500 m elevation.

*Ecology and conservation status*.—*Cybianthus peruvianus* occurs on the eastern slopes of the Andes in moist or wet lowland and premontane forests on white sands, especially in transition zones, where brownish sand-clay mixtures occur.

*Etymology*.—The epithet refers to the type locality, in (Moyobamba) Peru.

*Local name*.—Peru: “Tarrafá caspi.” (Quichua), “uchi yacushnum” (Aguaruna).

Representative specimens examined. ECUADOR. Napo: Cantón Aguarico, Reserva Faunística Cuyabeno, Laguna Zancudo Cocha (Iriparí), SE side of Laguna, 00° 33' S, 75° 32' W, 230 m, 28 Sep 1991 (fr), W. Palacios et al. 7761 (BRIT, MO, QCNE); Cantón Orellana, Sector Huashito, 20 km N of Coca, PALMORIENTE property, 00° 20' S, 77° 05' W, 250 m, 3–21 Nov 1989 (fr), E. Guidiño 137 (BRIT, MO, QCNE); Sendero to Palma Roja, 28 Apr 1986 (stam. fl.), J. Juramillo 8522 (QCA). Zamora-Chinchipe: Cantón Nangaritzá Campamento Miazí, along Río Nangaritzá, 900 m, 19 Feb 1994 (fr), H. van der Werff et al. 13280 (BRIT, MO, QCNE); Hill above military post, 04° 18' S, 78° 40' W, 1,000 m, D. Neill & W.

*Palacios* 9615 (BRIT, MO, QCNE), 04° 16' S, 78° 42' W, 970 m, 20 Oct 1991 (fr), W. *Palacios et al.* 8486 (BRIT, COL, MO, QCNE). PERU. Amazonas: Along Río Marañón, near confluence with Río Santiago, 1924 (stam. fl.), G. *Tessmann* 3525 (B, G); Prov. Bagua, Dtto. Imaza, NE region of Río Marañón Drainage Basin, Comunidad Kampenza, along Quebrada Shimutaz, Río Marañón, 04° 55' S, 78° 19' W, 320 m, 9 Sep 1994 (pist. fl, fr), N. *Jaramillo et al.* 436 (AMAZ, BRIT, HUT, MO, USM), 09 Oct 1995 (fr), N. *Jaramillo & D. Chamik* 813 (AMAZ, BRIT, MO, USM); Comunidad Aguaruna de Putuim (CAMPOU), anexo Yamayakat, Monte Alto de Putuim, 450 m, 25 Aug 1994 (fr), C. *Díaz et al.* 6993 (BRIT, HUT, MO, USM), 660-760 m, 21 Sep 1994 (stam. fl), C. *Díaz et al.* 7170 (BRIT, MO, USM); Cerros de Putuim, 05° 03' 20" S, 78° 20' 23" W, 350 m, 13 Jun 1996 (fr), R. *Vásquez et al.* 21131. Huánuco: Prov. Pachitea, region of Pucallpa, W part of Sirá Mountains and adjacent lowland, 20-24 km SE of Puerto Inca, Campamento Oro, 09° 29' S, 74° 50' W, to Campamento Sirá, 800 m, 17 Jul 1988 (stam. fl), W. *Morawetz & B. Wallnöfer* 22-19188 (BRIT, W, WU). Loreto: Prov. Loreto, Nauta, 04° 32' S, 73° 35' W, 160 m, 2 Jun 1984 (fr), R. *Vásquez & N. Jaramillo* 5060 (AMAZ, MO, USM); Zúngatu Cocha, 15 km SE of Iquitos, 9 Sep 1964 (stam. fl), C. *Dodson* 2821 (AMAZ, MO, US, USM); Prov. Maynas, Moropón, lower Río Nanay above Bellavista, 29 Aug 1968 (fr), S. *McDaniel* 10942 (AMAZ, IEB, MO); Tamishiyacu, Quebrada Blanco Biol. Station, Camp II, Quebrada Blanco, Tahuayo River, 04° 23' S, 73° 17' W, 4 Apr 1985 (fr), J. *Castro* 27 (AMAZ, MO, US, USM); Dtto. Iquitos, Hwy to Sto. Tomás, path in front of "Chaparal" chicken farm, 140 m, 16 Dec 1983 (stam. fl), M. *Rimachi* 7232 (AMAZ, IBE, MO, US); Estación Experimental IIAP Allpahuayo, 21 km S of Iquitos, 04° 10' S, 73° 30' W, 160 m, 18 Sep 1990 (ster.), J. *Pipoly et al.* 12112 (AMAZ, MO, US, USM), 220 m, 19 Sep 1990 (stam. fl), J. *Pipoly et al.* 12210 (AMAZ, MO, NY, USM); Dtto. Sta. Marfa de Nanay, 10 km W of Caserío Mishana, in Cocha Yaramá Reserve, 03° 55' S, 73° 35' W, 130 m, 14 Mar 1991 (ster.), J. *Pipoly et al.* 14994 (AMAZ, MO, US, USM), (ster.), J. *Pipoly et al.* 14997 (AMAZ, MO, USM); Mishana, along Río Nanay, 03° 51' S, 73° 32' W, 150 m, 22 Apr 1986 (stam. bud), R. *Vásquez et al.* 7503 (AMAZ, MO, US, USM), 8 Sep 1990 (fr), R. *Vásquez et al.* 14335 (AMAZ, BISH, F, MO, NY, TEX, US, USM); Mishana, 0 3° 52' S, 73° 30' W, 140 m, 4 Jan 1983 (fr), A. *Gentry et al.* 39040 (AMAZ, MO, USM); Dtto. Iquitos, Puerto Almendras, Arboretum Ciencias de Ingeniería Forestal, UNAP, 03° 48' S, 73° 25' W, 122m, 4 Sep 1992 (ster.), C. *Grández et al.* 4711 (AMAZ, BRIT, MO, USM), Puerto Almendras, along Río Nanay, 03° 45' S, 73° 25' W, 122 m, 30 Oct 1984 (fr), R. *Vásquez & N. Jaramillo* 5867 (AMAZ, MO, NY, USM), 29 May 1986 (ft), R. *Vásquez & N. Jaramillo* 7570 (AMAZ, MO, US, USM), 30 May 1986 (stam. bud), R. *Vásquez & N. Jaramillo* 7587 (AMAZ, MO, US, USM); Quistococha, IMARPE tract, along Rd. 13 km from Iquitos, 14 Jul 1976 (fr), F. *Encarnación* 864 (AMAZ, US); Prov. Requena, Dtto. Sapuena, Jenaro Herrera, Río Ucayali, 04° 55' S, 73° 40' W, 160 m, 16 Aug 1994 (stam. fl), R. *Ortiz et al.* 98 (AMAZ, BRIT, MO, USM). Madre de Dios: Prov. Tambopata, Santuario Nacional Pampas del Heath, Quebrada Palma Real Grande, 12° 57' 11" S, 68° 54' 48" W, 210 m, 21 Apr 1996 (fr), M. *Aguilar & D. Castro* 623 (BRIT, MO, USM), Puesto Enahuipa, 12° 39' 23" S, 68° 44' 13" W, 210 m, 25 Apr 1996 (fr), M. *Aguilar & D. Castro* 655 (BRIT, MO, USM). San Martín: Prov. San Martín, trail to television antenna, km 17.5 of Tarapoto-Yurimaguas Rd., 2.5 km N of Cataratas de Ahuashiyacu, 06° 27' S, 76° 21' W, 850-1,200 m, 7 Sep 1986 (pist. fl, fr), S. *Knapp* 8290 (MO, US, USM).

*Cybianthus peruvianus* is most closely related to *C. compernianus* Pipoly (herein described), but may be recognized by its longer, canaliculate petioles, revolute leaf margins, shorter pedicels, asymmetric, lepidote corolla lobes, and linear-lanceolate anthers. Field studies near Iquitos have shown



FIG. 12. *Cybianthus comperuvianus* Pipoly. A. Habit, showing inflorescence of racemes or malformed panicles. B. Staminate flower and axillant bract, showing floral densely lepidote floral bract as long as pedicel, and lepidote calyx margins. C. Opened staminate flower, showing staminal tube longer than apical free portions of the filaments, lobes glandular-granulose adaxially and crenulate margins. A-C, drawn from holotype, by Linny Heagy.

it is a ridgetop species in the lowlands, with a density of approximately 2–4 individuals per hectare.

**8. *Cybianthus comperuvianus* Pipoly, sp. nov. (Fig. 2E, 12).** TYPE: BRAZIL. MATO GROSSO: Sta. Anna da Chapada, 1903 (stam. fl), G. Malme 3483 (HOLOTYPE; S; ISOTYPES: G, GH, R, S).

*Cybianthus comperuvianus* Agostini ex Pipoly in Killeen et al., Guia Arb. Boliv. 570. 1993. *nom. nud.* Agostini (1972) provided the first description of this species in his dissertation, but never published it. I subsequently annotated herbarium specimens with the name, fully intending to publish it, but it was still not validly published when it appeared in *Guia de Arboles de Bolivia*, without Latin description or reference to type. Presumably, the name was obtained by them based on herbarium determinations, and thus a *nomen nudum* and invalid. Validation of the name is effected here, with the citation of holotype above and the Latin diagnosis, and accompanying description, provided below.

Species haec cum *C. peruviana* saepenumero confusus est, sed laminis membranaceis (non coriaceis), secus margines planis (nec revolutis), petiolis marginatis (non canaliculatis) 0.5–1 (nec 1–1.5) longis, pedicellis 1.5–2.5 (non 0.7–1.0) mm longis, corollis staminaribus salverformibus (non campanulatis) statim diagnostica.

*Shrub or small tree to 6 m tall. Branchlets angulate, 1.5–2 mm diam., densely lepidote. Leaves alternate; membranaceous, elliptic, narrowly elliptic, to obovate, 9–13(–17) cm long, 3–5(–6) cm wide, apically acuminate, basally acute, decurrent on the petiole, the midrib slightly depressed above, prominently raised below, pusticulate above, densely lepidote below, the secondary veins 20–30 pairs, the margin flat; petioles marginate, 0.5–1 cm long, densely lepidote. Staminate inflorescence: a raceme, rarely a malformed panicle with 2 branches from the base, 1–3 cm long; peduncle 0.1–0.5 cm long; floral bracts membranaceous, ovate, 1.3–1.5(–2.0) mm long, ca. 0.6 mm wide, subglabrous, sparsely lepidote above and densely lepidote below, apically acute, slightly shorter than or as long as the pedicels, entire; pedicels cylindrical, 1.2–2.5 mm long, sparsely lepidote. Staminate flowers whitish-green, 4(–5)-merous, membranaceous; calyx cupuliform, 1–1.2 mm long, the tube 0.3–0.6 mm long, the lobes triangular to deltate, 0.6–1 mm long, 0.5–0.7 mm wide, apically attenuate to a rounded tip, sparsely lepidote without, glabrous within, conspicuously brown punctate, the margin entire, sparsely ferrugineous-lepidote; corolla salverform, 2.2–2.6 mm long, the tube 1–1.2 mm long, the lobes ovate to ovate-triangular, 1.2–1.6 mm long, 0.8–1 mm wide, apically rounded or attenuate to a rounded tip, glabrous without, glandular-granulose throughout within, the margin minutely crenulate, glandular-granulose, conspicuously brown punctate; stamens 1.8–2.2 mm long, adnate 1.2–1.5 mm to corolla tube, staminal tube 1.6–1.9 mm long, elobate, longer than the apically free portions of the filaments 0.2–0.3 mm long, the anthers deltate to triangular, slightly distally curved, 0.7–0.8 mm long, 0.5–0.6 mm wide, apically apiculate, basally broadly cordate, the connective incon-*

spicuously brown punctate; pistillode lageniform, 1.0–1.2 mm long, 0.3–0.4 mm wide, the ovary 0.4–0.5 mm long, densely translucent glandular-lepidote near base, the style 0.5–0.6 mm long, the stigma punctiform. *Pistillate* inflorescence as in staminate but pedicel 1.5–2.5 mm long. *Pistillate flowers* as in staminate but calyx 1.0–1.2 mm long, the tube 0.3–0.6 mm long, the lobes deltate, 0.6–1 mm long and wide, corolla, staminodes and pistil unknown. *Fruit* globose, 5–7 mm long, 6–8 mm diam.

*Distribution.*—Ecuador southward to Bolivia and adjacent Brazil, 400–1,200 m elevation.

*Ecology and conservation status.*—*Cybianthus comperuvianus* occurs in primary premontane forests on sandstone and limestone, in relatively sparse populations (teste collectore). Therefore, it should be considered threatened.

*Etymology.*—The specific epithet refers to the fact that *Cybianthus comperuvianus* has long been confused with *C. peruvianus*.

*Local name.*—Peru: “wewe” (Jívaro); “uchi apikna” (Huambisa); “Cumalilla” (Spanish).

**PARATYPES.** ECUADOR. Morona-Santiago: Sitio La Planada, 01° 46' S, 77° 57' W, 900 m, 21 Sep 1993 (stam. fl.), *W. Palacios 11407* (BRIT, MO, QCNE). PERU. Amazonas: Near Yucui Entsa, 6 hrs. from Camino de Kusu, 300 m, 11 Mar 1973 (fr), *R. Kayap 558* (MO, NY, USM), (fr), *E. Ancash 93* (AMAZ, BRIT, F, LL-TEX, MO, NY, US, USM); Quebrada Huampami, Tsesim, near Nayumpim, 244 m, 3 Apr 1973 (fr), *E. Ancash 141* (AMAZ, F, LL-TEX, MO, US, USM); Quebrada Yutui Entsa, 305 m, 12 Apr 1973 (fr), *E. Ancash 220* (AMAZ, F, LL-TEX, MO, US); Prov. Bagua, Dtto. Imaza, NE Region of Río Marañon Drainage Basin, Comunidad de Yamayakat, Río Marañon, 04° 55' S, 78° 19' W, 320 m, 8 Aug 1994 (stam. fl.), *N. Jaramillo et al. 321* (BRIT, HUT, MO, USM). Ayacucho: Tambillo, Toche Colorado, 27 Jul. 1878 (fr), *C. Jelski 360* (PR, W). Huánuco: E of Tingó María, 5 Oct. 1972 (stam. fl.), *T. Croat 21194* (F, USM, MO); Agua Blanca, trail to Monzón, 9 Feb 1966 (stam. fl.), *J. Schunke 1049* (AMES, MO, NY, S, USM, VEN); vicinity Rondos, 24 Mar. 1962 (stam. fl.), *J. Schunke 5881* (F, US, USM); Prov. Pachitea, region of Pucallpa, W part of Sirá Mountains and adjacent lowland, 20–24 km SE of Puerto Inca, Campamento Oro, 09° 29' S, 74° 50' W, to Campamento Sirá, 800 m, 17 Jul 1988 (stam. fl.), *B. Wallnöfer 12-17788* (BRIT, MO, W, WU), 30 Aug 1988 (fr), *W. Morauetz & B. Wallnöfer 13-30888* (BRIT, W, WU), from Campamento Sirá, 09° 28' S, 74° 47' W, SE to valley of Río Negro, 650 m, 11 Aug 1988 (fr), *W. Morauetz & B. Wallnöfer 113-11888* (BRIT, MO, W, WU). Junín: E of Quimirí Bridge, near La Merced, 800–1,300 m, 1 Mar 1929 (stam. fl.), *E. Killip & A. C. Smith 24011* (F, NY, US); La Merced, Hacienda Schunke, 27 Aug–1 Sep 1923 (stam. fl.), *J. Macbride 5677* (F); Pichís Trail, San Nicolás, 1,100 m, 4 Jul 1929 (stam. fl.), *E. Killip & A. C. Smith 26073* (F, NY, US), Sta. Rosa, 625–900 m, 6 Jul 1929 (stam. fl.), *26168* (BM, F, NY, US, USM); Puerto Yessup, 400 m, 10 Jul 1929 (stam. fl.), *E. Killip & A. C. Smith 26286* (NY, US); Puerto Bermudez, 375 m, 14 Jul 1929 (stam. fl.), *E. Killip & A. C. Smith 26464* (NY, US), *26548* (NY, US), *26563* (NY, US). Pasco: Prov. Oxapampa, Pichís Valley, San Matías Ridge, 10–12 km SW of Puerto Bermudez, above Sta. Rosa de Chirís, trail to Loma Linda, 10° 20' S, 75° 00' W, 500 m, 29 Sep 1982 (fr), *R. Foster et al. 8962* (F, MO, USM). Puno: Below San Gabón on Río San Gabón, 500–1,000 m, 17–24 Jul 1978 (stam. bud), *M. Dillon et al. 1219* (BRIT, F, MO, USM). San Martín: Prov. Mariscal Cáceres, Dtto. Tocache Nuevo, Palo Blanco near Fundo de Manuel Aranjo, 700–800 m, 1

Mar 1979 (fr), *J. Schunke* 10895 (AMAZ, BRIT, F, MO, NY, US); without specific locality, 1778–1788 (stam. fl.), *Ruiz L. & J. Pavón* 5/36 (F, MA). BOLIVIA. La Paz: Mapiri Region, 1926 (stam. fl.), *O. Buchten* 1753 (F, GH, HBG, NY, US); Turi, near Mapiri, 490–750 m, Sep 1939 (stam. fl.), *B. Krukoff* 10930 (A, G, GH, MO, MICH, NY, S, U, UC, US). Santa Cruz: Velasco; Parque Nacional Noel Kempff Mercado, Campamento las Gamas, 14° 48' 41" S, 60° 23' 45" W, 850 m, 26 Mar 1993 (fr), *L. Arroyo & K. Keill* 164 (BRIT, MO, USZ); Campamento Huanchaca, 13° 54' S, 60° 48' W, 650 m, 17 May 1994 (stam. fl.), *L. Arroyo et al.* 674 (BRIT, MO, USZ). BRAZIL. Mato Grosso: Mpio. Cuiabá, Burity, NE of Cuiabá, 750 m, Jul 1927 (stam. fl.), *B. Collenette* 113 (NY); Chapada dos Guimrães, Cachoeira Véu de Noiva, do Rio Coxipozinho, 15° 30' S, 55° 45' W, 21 Oct. 1985 (fr), *J. Pirani* 1326 (INPA, MG, NY, SP), 720 m, 16 Oct 1973 (fr), *G. Prance et al.* 19075 (AAU, F, INPA, K, MG, NY, K, S, SP, U, US); Sta. Anna da Chapada, 1902 (stam. fl.), *G. Malme* 2048 (S, UPS), 1903 (fr), *G. Malme* 3483 (G, GH, R, S), 1827 (stam. fl.), *L. Riedel* 959 (LE, NY, US), 1902 (fr), *A. Robert* 322 (BM). Rondônia: 1 km NE of Ariquemes, Porto Vehlo-Cuiabá Hwy., 13 Aug 1968 (fr), *E. Forero & L. Wrigley* 7035 (MG, MO, NY).

*Cybianthus comperuvianus* was first recognized as a novelty by Agostini (1972). Despite the fact that over 25 years has past since its first recognition, pistillate flowers are still unknown, reinforcing the concept that within the genus they are ephemeral (Pipoly 1983a, 1992). *Cybianthus comperuvianus* is most closely related to *C. peruvianus* but is easily distinguished by its long pedicels, salverform stamineate corolla, and membranaceous leaves.

9. *Cybianthus guyanensis* (A. DC.) Miq. in Mart. subsp. *pseudoicacoreus* (Miq. in Mart.) Pipoly, comb. et stat. nov. (Fig. 2F). *Ardisia pseudoicacoreia* Miq. in Mart., Fl. Bras. 10:284. 1856. *Conomorpha pseudoicacoreia* (Miq. in Mart.) Mez in Engl., Pflanzenr. IV. 236(Heft 9):261. 1902. *Cybianthus pseudoicacoreus* (Miq. in Mart.) G. Agostini, Acta Biol. Venez. 10:155. 1980. TYPE: BRAZIL. AMAZONAS: In forest near Rio Japurá, Jan 1820 (pist. fl, fr), *C. Martinus s.n.* (LECTOTYPE, here designated: M; ISOLECTOTYPE: M).

*Shrub or tree to 7 m tall. Branchlets terete, 2–3 mm diam., densely lepidote. Leaves alternate; blades membranaceous to chartaceous, narrowly obovate to elliptic, symmetric, (8–)9–12(–18.5) cm long, 3–4.5(–5.7) cm wide, apically abruptly acuminate to caudate, the acumen 1–2 cm long, basally cuneate, decurrent on the petiole, midrib flat or slightly depressed on the upper surface, prominently raised below, the secondary veins 12–25 pairs, pustulate above, sparsely lepidote below, the margin flat; petioles canaliculate, 0.5–0.8(–1.5) cm long, densely lepidote. Stamineate inflorescence: a raceme or panicle with 1–2 branches from base, 1–3 cm long; peduncle, rachis and pedicels densely lepidote; peduncle 0.1–0.2 mm long; floral bracts chartaceous, narrowly ovate, longer than the pedicels, 1.3–1.5 mm long, 0.2–0.3 mm wide, apically attenuate, densely lepidote abaxially; pedicels cylindrical, 1–1.2 mm long. Stamineate flowers 4-merous; calyx carnose, subcupuliform, 1–1.2 mm long, sparsely lepidote without, glabrous within, the tube 0.3–0.4 mm long, the lobes triangular, 0.8–1(–1.2) mm long, 0.5–0.7 mm wide, apically attenuate to a rounded tip, conspicuously brown punctate, the margin lepidote;*

corolla carnose, campanulate, 2.8–3.2 mm long, the tube 1.2–1.8 mm long, glabrous, the lobes ovate, 1.3–1.8 mm long, 0.8–1 mm wide, erect to spreading, apically attenuate to a round tip, prominently or conspicuously brown punctate, sparsely lepidote without, densely glandular-granulose on the upper half within, the margin entire, glandular-granulose; stamens 2.2–2.6 mm long, the staminal tube conspicuous, carnose, 1.2–1.6 mm long, lobate, the lobes to 0.2 mm long, the apically free portions of the filaments 0.4–0.6(–7) mm long, the anthers triangular, 0.7–0.9 mm long, 0.4–0.5 mm wide, slightly distally recurved, dehiscent by narrow introrse slits, apically attenuate to an apiculate tip, basally cordate, the connective inconspicuously brown punctate; pistillode elongate, conic, 1.2–1.8 mm long, densely translucent glandular-lepidote basally. *Pistillate inflorescence* as in staminate but 1–3 cm long; floral bracts 1–1.3 mm long, ca. 0.2 mm wide; pedicels 0.6–0.9 mm long. *Pistillate flowers* as in staminate but calyx ca. 1 mm long, the tube 0.1–0.2 mm long, the lobes 0.8–1 mm long, 0.4–0.6 mm wide; corolla, staminodes and pistil unknown. *Fruit* subglobose, 4–6 mm long, 5–7 mm diam., exocarp thin, pellucid punctate.

*Distribution.*—Venezuela, Ecuador, Peru, Amazonian Brazil, and reported here for the first time from Bolivia, from 70–700 m.

*Ecology and conservation status.*—*Cybianthus guyanensis* subsp. *pseudoiacoreus* inhabits igapó forests of South-Central and Western Amazonia. It occurs in these forests on deep white sands just below the floodline. It is periodically inundated, but not for long periods. Quantitative fieldwork in Peru has shown it occurs in populations of 8–10 individuals > 2.5 cm DBH per hectare.

*Etymology.*—The subspecific epithet refers to the growth habit of the plant, somewhat reminiscent of *Ardisia* (subgenus *Iacorea*) *guyanensis* (Aublet) Mez.

Representative specimens examined. ECUADOR. Napo: Cantón Aguarico Reserva Étnica Huaorani, Maxus Oil Hwy., km 60–61, S of Río Tivacuno, 00° 51' S, 76° 26' W, 250 m, 21–25 Oct 1993 (fr), M. Andlestia & J. Andi 925; Maxus Petroleum pipeline Rd., km 68, 10 km SW of Río Tivacuno, 00° 49' S, 76° 26' W, 240 m, 13 Dec 1993 (fr), D. Neill et al. 10303 (BRIT, MO, QCNE); (BRIT, MO, QCNE); Estación Experimental INIAP-Payamino, 5 km NE of Coca, 00° 26' S, 77° 01' W, 250 m, 18–26 Feb 1986 (fr), W. Palacios et al. 1040 (MO, NY, QAME), (stam. fl), W. Palacios et al. 1050 (MO, NY, QAME), 00° 25' S, 77° 00' W, 250 m, 29 Nov 1986 (fr), D. Neill 7494 (MO, QAME); Parque Nacional Yasuní, Lagunas de Garza Cocha, shore of Río Garza, 01° 01' S, 75° 47' W, 200 m, 22 Sep 1997 (fr), C. Cerón & N. Gallo 5063 (MO, QCNE), trail behind the house, 850 m, 27 Apr 1986 (fr), J. Jaramillo 8501 (QCA). PERU. Loreto: Prov. Maynas, Iquitos, G. Tessmann 3650 (NY), 100 m, 3–11 Aug 1929 (fr), E. Killip & A. C. Smith 27005 (F, NY, US); Mishuyacu, near Iquitos, 100 m, 1930 (stam. fl), G. Klug 1412 (F), Feb 1932 (fr), G. Klug 2565 (F, NY), 24 Sep 1929 (stam. fl), E. Killip & A. C. Smith 29871; Dtto. Alto Nanay, trail leading N from N end of Sta. María de Nanay, 5 Mar 1968 (stam. fl.), D. Simpson & J. Schunke 784 (F, US); Dtto. Indiana, Explorama Lodge, halfway between Indiana and mouth of Río Napo, 03° 28' S, 72° 50' W, 130 m, 26 Jun 1983 (fr), A. Gentry et al. 42183 (AMAZ., MO), Far

end of Bushmaster Trail, 140 m, 5 Jan 1991 (ster.), A. Gentry et al. 72129 (AMAZ, MO, US, USM), Explorama Lodge, near Yanamono, 25 km NE of Iquitos, 03° 30' S, 72° 50' W, 106 m, 24 Nov 1981 (fr.), R. Vásquez & N. Jaramillo 2703 (AMAZ, MO, US, USM), Perimeter path at southern boundary of reserve, 110 m, 27 Sep 1990 (ster.), J. Pipoly et al. 12492 (AMAZ, MO, US, USM), 03° 28' S, 72° 52' W, 106 m, 15 Apr 1992 (fl bud), R. Vásquez & N. Jaramillo 18240 (AMAZ, BRIT, MO, USM); Dtto. Iquitos, Allpahuayo, Estación Experimental del IIAP, 04° 10' S, 73° 30' W, 150–180 m, 3 Nov 1990 (fr.), R. Vásquez & N. Jaramillo 14545 (AMAZ, BRIT, MO, USM) 8 Nov 1990 (ster.), R. Vásquez & N. Jaramillo 15016 (AMAZ, MO, US, USM); Puerto Almendras, 2 Jul 1992 (fr.), R. Rueda & J. Ruiz 597 (AMAZ, BRIT, MO); PuertoAlmendras, Arboretum Colegion Ingeneria Forestal UNAP, 03° 48' S, 73° 25' W, 122 m, 4 Sep 1992 (ster.), C. Grández et al. 4487 (AMAZ, BRIT, MO, USM); Dtto. Las Amazonas, Quebrada Sucusari, 03° 15' S, 72° 55' W, 140 m, 11 Aug 1994 (stam. fl.), R. Ortiz et al. 74 (AMAZ, BRIT, MO, USM); Dtto. Sta. María de Nanay, Mishana, 03° 55' S, 73° 35' W, 90 m, 1 Oct 1990 (ster.), J. Pipoly et al. 12706 (AMAZ, MO, USM). Madre de Dios: Prov. Manu, Cerro de Pantiacolla, Río Palotoa, 10–15 km NNW of Shintuya, 12° 35' S, 71° 18' W, 650–700 m, 13 Dec 1985 (ster.), R. Foster et al. 10993 (E, NY, USM); Prov. Tambopata, Santuario Nacional Pampas del Heath, Río Heath, 12° 39' 23" S, 68° 44' 13" W, 210 m, 5 Jun 1996 (stam. fl.), M. Aguilar & D. Castro 805 (BRIT, MO, USM). BOLIVIA. Santa Cruz: Dtto. Velasco, Parque Nacional Noel Kempff Mercado, Campamento La Torre, 13° 39' 20" S, 60° 49' 08" W, 200 m, 24 Nov 1993 (fr.), L. Arroyo et al. 510 (BRIT, MO, USZ).

*Cybianthus guyanensis* subsp. *pseudoicacorensis* is one of three subspecies. The species is defined by the autapomorphic contorted anthers of the stamens and staminodes (Pipoly 1992a). The three subspecies may be separated in the following key.

1. Leaf blades symmetric; calyx subcupuliform; corolla chartaceous or carnose, the lobes erect to spreading; apically free portions of the filaments shorter than the anthers; anthers narrowly triangular or ovate-triangular, apically apiculate, dehiscent by narrow, introrse slits.
  2. Petioles canaliculate and winged, (1)–1.5–1.9(–2.3) cm long; staminate peduncle 0.2–0.5 cm long; floral bracts shorter than the pedicels, 0.7–0.8 mm long; pedicels 0.5–1 mm long; corolla chartaceous, 2.3–2.6 mm long, the lobes elliptic; staminal tube 0.9–1.1 mm long; apically free portions of the filaments 0.2–0.4 mm long. .... subsp. *guyanensis*
  2. Petioles canaliculate, 0.5–0.8(–1.5) cm long; staminate peduncle 0.1–0.2 cm long; floral bracts longer than the pedicels, 1.3–1.5 mm long; pedicels 1–1.2 mm long; corolla carnose, 2.8–3.2 mm long, the lobes ovate; staminal tube 1.2–1.6 mm long; apically free portions of the filaments 0.4–0.6 (7) mm long ..... subsp. *pseudoicacorensis*
  1. Leaf blades asymmetric; calyx cotyliform; corolla membranaceous, the lobes reflexed-recurved; apically free portions of the filaments longer than the anthers; anthers ovate, apically acute, dehiscent by wide, sublatrorse slits.
- ..... subsp. *multipunctatus*

*Cybianthus* subspecies *multipunctatus* (A. DC.) Pipoly is distributed in eastern Amazonia and the Guianas in premontane forests on lateritic and white sands of the Roraima Superimposed Sediments, while subsp. *guyanensis* is located principally in central Amazonia in igapó forests (Pipoly 1992a). Subspe-

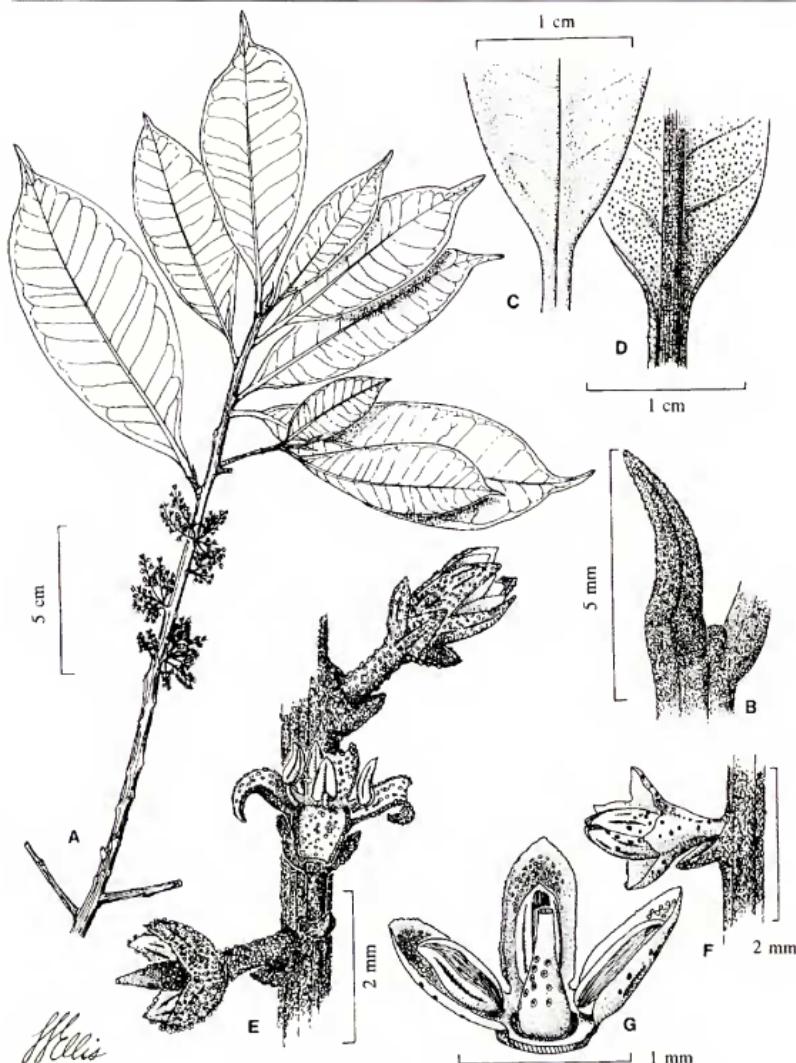


FIG. 13. *Cybianthus timanae* Pipoly. A. Habit, showing paniculate inflorescences. B. Branchlet apex. C. Adaxial leaf surface, showing midrib slightly raised but canaliculate. D. Abaxial leaf surface, showing lepidote scales and prominently raised midrib. E. Section of raceme, showing coriaceous, deltate floral bracts, coryliform calices, obcordate anthers with distally recurved apiculae. F. Pistillate flower bud. G. Pistillate corolla with one lobe removed, showing lageniform pistil and subsessile antherodes. A–E, drawn from holotype. F–G, drawn from Timaná 1047. Figure drawn by Linda Ellis.

cies *pseudoicacoreus* is distributed south-central and western Amazonia, along banks of smaller streams on deep white sands. Subspecies *pseudoicacoreus* and *guyanensis* are sympatric only in central Brazilian Amazonia, and differences in their ecology are not known in sufficient detail. In Ecuador and Peru, subspecies *pseudoicacoreus* may be most easily confused with *C. comperuvianus* Pipoly, but may be recognized by the thicker branchlets, longer floral bracts, and carnosé perianth.

**10. *Cybianthus timanae* Pipoly, sp. nov. (Fig. 13).** TYPE: PERU. JUNÍN: Prov. Satipo, Gran Pajonal, Mapati, ca. 12 km SW of Chequitavo, 10° 45' S, 74° 23' W, 1,300 m, 7 Apr 1984 (stam. fl), D. Smith 6782 (HOLOTYPE: MO; ISOTYPES: BRIT, US, USM).

Propter ramos graciles angulatos, laminas ellipticas vel oblanceolatas, ad apices acuminatas ad bases acutas, inflorescentiam paniculatam, calycem cotyliformem, necnon tubum staminarem staminodiaremque inconspicuo, *C. occigranatensi* arcte affinis, sed ab ea nervis secundariis 16–40 (non 8–12)-jugis, perianthiis chartaceis (non coriaceis), corolla cotyliformi (non campanulata), lobis corollinis laevibus (non verrucosis), ad apices acuminatis (nec attenuatis), conspicue (nec incounspicue) atro-punctatis, pistilo lageniformi (nec obnapiformi) perfacie separabilis.

*Subshrub* to 1 m tall. *Branchlets* angulate, 2–2.5 mm diam., densely lepidote. *Leaves* alternate; blades chartaceous, elliptic to oblanceolate, (8–) 9.5–15(–19) cm long, (2.7–)3–5.5(–6.5) cm wide, apically abruptly acuminate, caudate, the acumen 1–2.2 cm long, basally acute, decurrent on the petiole, smooth and nitid above, pallid and moderately lepidote below, midrib slightly raised and canaliculate above, not decurrent on the petiole, prominently raised below, secondary veins 16–40, brochidodromous, planar to somewhat impressed above, not bullate, the margin flat, entire; petioles canaliculate, (1.3–)1.5–2(–2.2) cm long, glabrous above, densely lepidote below. *Stamineate inflorescence*: a panicle of 2–8 racemes branched from base, (3–)4–6(–7) cm long; peduncle 3–7 mm long; rachis densely lepidote; floral bracts coriaceous, deltate, 0.6–0.8 mm long and wide, apically acute, somewhat cucullate, densely lepidote above and below, the margin entire; pedicels cylindrical, 1–2.5 mm long, densely lepidote. *Stamineate flowers* 4-merous, cream; calyx chartaceous, cotyliform, 0.7–1 mm long, the tube ca. 0.2–0.3 mm long, the lobes ovate-triangular, 0.5–0.7 mm long, 0.3–0.4 mm wide, apically acute, moderately lepidote, the margin entire, somewhat involute; corolla chartaceous, cotyliform, 2–2.4 mm long, the tube ca. 0.2 mm long, the lobes oblanceolate, 1.8–2.2 mm long, 0.8–1 mm wide, apically subacuminate, sparsely lepidote apically near margin, prominently black punctate and punctate-lineate without, densely glandular-granulose throughout within, the margin glabrous, entire; stamens 1.4–1.6 mm long, the tube conspicuous, chartaceous, 0.1–0.2 mm long, elobate, the apically free portions of the filaments terete, 0.4–0.6 mm long, the anthers obcordate, 0.6–0.7 mm long, 0.3–0.4 mm wide, apically apiculate, anther and apiculum distally recurved,

the connective prominently black punctate dorsally; pistillode conic, 1.2–1.4 mm long, 0.3–0.4 mm wide, hollow, densely translucent glandular-lepidote. *Pistillate inflorescence* as in staminate, but (1–)1.5–3 cm long; peduncle 2–4 mm long; floral bracts 0.4–0.6 mm long and wide; pedicels obconic, 0.6–0.9 mm long, sparsely lepidote, conspicuously black punctate. *Pistillate flowers* as in staminate but translucent green; calyx 0.7–0.9 mm long, the tube ca. 0.2 mm long, the lobes 0.5–0.7 mm long, 0.3–0.4 mm wide, sparsely lepidote, corolla 1.2–1.5 mm long, the tube ca. 0.2 mm long, the lobes oblong to oblanceolate, 0.9–1.3 mm long, 0.4–0.6 mm wide, apically obtuse to subacuminate; staminodes 0.6–0.8 mm long, the tube conspicuous, chartaceous, ca. 0.1 mm long, the antherodes subsessile, 0.6–0.7 mm long, 0.3–0.4 mm wide; pistil lageniform, 1.2–1.4 mm long, 0.3–0.4 mm wide, hollow, densely translucent glandular-lepidote, the ovules 2–3, partially immersed on the placenta. *Fruit* slightly depressed-globose, 4.5–5.5 mm long, 5.5–7.5 mm diam., the exocarp thin, black at maturity.

*Distribution.*—Southeastern Ecuador to Cusco Peru, at 720–1,300 m elevation.

*Ecology and conservation status.*—*Cybianthus timanae* usually occurs in wet premontane forest on sandstone soils. The restricted distribution of *Cybianthus timanae* indicates it should be considered a threatened species.

*Etymology.*—The species is named for Martín Timaná de la Flor, former Peruvian Field Associate of the Missouri Botanical Garden, and currently a graduate student at the University of Texas at Austin. Martín is specializing in the systematics of high altitude Caryophyllaceae.

**PARATYPES. ECUADOR.** Zamora-Chinchipe: Nangarita Cantón; lower slopes of Cordillera del Cóndor, above Pachicutza, Río Nangarita Valley, 04° 07' S, 78° 38' W, 1,000–1,200 m, 6 Dec 1990 (fr), D. Neill & W. Palacios 9556 (BRIT, MO, QCNE); Río Nangartiza, Shaime, confluence of Ríos Nangarita and Numptakaimé, 04° 20' S, 78° 40' W, 1,000 m, 7 Dec 1990 (fr), D. Neill 9602 (BRIT, MO, QCNE); Pachicutza, Rd. to Hito, Cordillera del Cóndor, 04° 07' S, 78° 37' W, 1,000–1,100 m, 19 Oct 1991 (pist. fl bud), W. Palacios et al. 8346 (BRIT, COL, MO, QCNE), 20 Oct 1991 (stam. fl), W. Palacios et al. 8407 (BRIT, COL, MO, PORT, QCNE, USM); Parroquia Pachicutza, NE of military camp, 900 m, 6 Dec 1990 (fr), J. Jaramillo & E. Grijalva 13419 (COL, QCA). **PERU.** Cajamarca: Cutervo National Park, 12 km NE of San Andrés de Cutervo, Transect 3, 06° 10' S, 78° 40' W, 2,230 m, 10 Sep 1991 (ster.), A. Gentry et al. 74630 (BRIT, MO, USM). Cusco: Prov. Quispicanchi, Camanti, Maniri, along trail parallel to Río Maniri to Quebrada Garrote, 13° 17' S, 70° 48' W, 720 m, 17 Oct 1990 (pist. fl), M. Timaná 1047 (BRIT, CUZ, MO, US, USM).

*Cybianthus timanae* is most closely related to *C. occigranatensis* (Cuatrec.) G. Agostini, but may be easily separated by its more numerous secondary veins, chartaceous perianth parts, coryliform corolla with smooth, conspicuously black punctate, acuminate lobes, and lageniform pistil. The involute calyx lobes and the obconic pedicels of the pistillate flowers are also extremely rare within the subgenus.

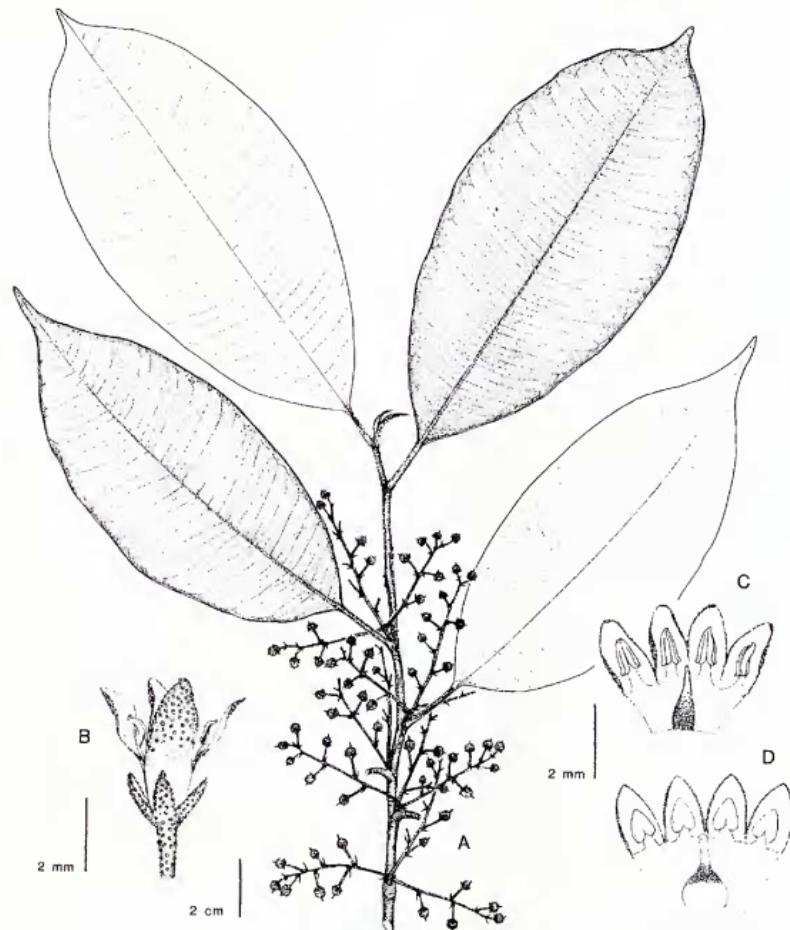


FIG. 14. *Cybianthus cuatrecasasii* Pipoly. A. Habit, showing irregularly shaped, basally branched panicles. B. Staminate flower, habit, showing coryliform calyx, infundibuliform corolla. C. Opened staminate flower, showing inconspicuous staminal tube and lageniform pistillode. D. Opened pistillate flower, showing obnapiform pistil and subsessile antherodes. A–C, drawn from holotype. D, drawn from A. Gentry et al. 53960. Figure drawn by Juan Pinzón.

### 11. *Cybianthus cuatrecasasii* Pipoly (Fig. 14), Caldasia 18(3):285. 1996.

TYPE: COLOMBIA. HUILA: Municipio La Plata, Vereda Agua Bonita, Finca Merenberg, cerca del Cementerio (Jardín Botánico), 22 Abr 1982 (stam. fl.) J. H. Torres 1054 (HOLOTYPE: COL).

Dioecious tree to 6 m tall. Branchlets narrowly angulate, 3–4 mm diam.,

densely appressed-lepidote, the scale margins frequently overlapping. *Leaves* alternate; blades chartaceous, elliptic or oblanceolate, 8–20 cm long, 3.5–6.5(–6.9) cm wide, apically acuminate, the acumen (0.5–)1.0–1.5(–2.0) cm long, basally acute, slightly decurrent on the petiole, midrib impressed above, prominently raised below, the secondary veins 26–34 pairs, inconspicuous above, prominently raised below, sparsely lepidote above at first, then pustulate and glabrescent, densely appressed-lepidote below with margins fimbriate and overlapping, the blade margin flat, entire; petioles canaliculate, (1.0)1.3–1.7(–2.0) cm long, densely appressed-lepidote. *Staminate inflorescence*: an irregular panicle with 2–4 basal branches, 4–8 cm long; peduncle, rachis and pedicels densely lepidote; peduncle 0.1–0.4 cm long; floral bracts chartaceous, triangular, subequaling the pedicels, 1.2–1.5 mm long, ca. 0.6 mm wide, apically attenuate, densely lepidote below, the margin entire, glabrous; pedicels cylindric, 1.0–1.5 mm long. *Staminate flowers* 4-merous; calyx carnose, coryliform, 1.3–1.4 mm long, the tube 0.2–0.4 mm long, the lobes triangular or ovate-triangular, 1.0–1.2 mm long, 0.6–0.9 mm wide, apically attenuate, conspicuously brown punctate, the margin entire, regular, with few scales; corolla chartaceous, infundibuliform, 3.0–3.5 mm long, the tube 1.2–1.3 mm long the lobes ovate, 2.0–2.2 mm long, 1.0–1.2 mm wide, apically rounded, carinate medially, densely lepidote without and along the margins, glandular-granulose toward the apex and along the margins within, inconspicuously brown punctate, the margins regular, entire; stamens 2.5–3 mm long, the staminal tube membranaceous, inconspicuous, 1.2–1.3 mm long, hyaline, elobate, glabrous, the apically distinct filaments adnate to the corolla lobe above the staminal tube 0.3–0.5 mm and apically free 0.1–0.3 mm, glabrous, the anthers ovate, 0.8–1.0 mm long, 0.5–0.6 mm wide, distally reflexed, apically apiculate, the apiculum slightly inflexed, basally cordate, the connective dark, eglandular; pistillode lageniform, 1.6–1.8 mm long, densely glandular-lepidote basally. *Pistillate inflorescence*: as in the staminate except a simple raceme, 4.4–10 cm long; peduncle 0.2–0.5 cm long; floral bracts lanceolate, 1.2–1.5 mm long, 0.3–0.4 mm wide; pedicels 0.7–1.3 mm long, incrassate in fruit. *Pistillate flowers* similar to the staminate except calyx 1.4–1.7 mm long, the tube 0.2–0.4 mm long, the lobes ovate, 1.3–1.5 mm long, 0.6–1.2 mm wide; corolla 3.5–4.0 mm long, the tube 0.9–1.1 mm long, the lobes elliptic, 2.7–3.1 mm long, 0.9–1.3 mm wide, apically acute; staminodes similar to stamens but 3.0–3.2 mm long, the staminodial tube 1.0 mm long, the apically free portion of the filaments adnate to corolla lobes 1.3–1.5 mm and apically free ca. 0.1 mm, the antherodes subdeltate, 0.8–1.1 mm long and wide, (always longer than wide), apically acute, basally sagittate; pistil obnapiform, 1.8–2.0 mm long, the ovary 0.9–1.0 mm long, 1.2–1.5 mm diam., densely translucent glandular-lepidote, the style 0.9–1.1 mm long, the stigma bilobate, not capitate, the placenta deeply cupuliform,

the ovules 2, deeply embedded in the placenta below apical pores. *Fruit* drupaceous, depressed-globose, 4–6 mm long, 6–8 mm diám., the endocarp smooth, the embryo erect, 3 mm long.

*Distribution.*—*Cybianthus cuatrecasasii* occurs in the Western Cordillera of Colombia in the Department of Antioquia, in the Central Cordillera near the Macizo Colombiano, in the Departments of Huila and Cauca, and in the Western Cordillera of adjacent Ecuador, with disjunct populations in the Province of Santiago-Zamora, and Zamora-Chinchipe, Ecuador, from (1,200–)1,960–2,850 m elevation.

*Ecology and conservation status.*—*Cybianthus cuatrecasasii* occurs along the margins of primary cloud forests and along small watercourses. The population from Antioquia, Colombia is rare because it is from premontane pluvial forest, and has leaves much shorter than normal. Because it is known only from primary forests, it should be considered threatened.

*Etymology.*—This species is named to honor the late José Cuatrecasas, prodigious field botanist, monographer of many plant families, and ardent student of the Colombian flora. Don José freely offered his advice and assistance to all who asked, despite his limited time and numerous projects.

Specimens examined. COLOMBIA. Antioquia: Mpio. San Luis, Piedra de Castrillón, 3–4 hours by foot S of town, 06° 01' N, 75° 01' W, 1,500–1,700 m, 8 May 1989 (fl bud), D. Daly et al. 5926 (HUA, MO, NY, US). Huila: Cordillera Central, E slope, Finca Merenberg, km 101 of La Plata-Popayán Rd., 13 km E of Sta. Leticia, 02° 15' N, 76° 12' W, 2,300 m, 24 Mar 1986 (fl bud), B. Stein 3721 (BRIT, MO); Cordillera entre cuencas de los ríos Guarapas y Guachicas, arriba de Palestina, al SW de Pitalito, 2,000–2,300 m, 6 Feb 1943 (stam. fl), F.R. Fosberg 19969 (NY, US); Finca Merenberg, E de Volcán Puracé, cerca de la zona límitrofe con Cauca, 02° 26' N, 76° 12' W, 2,300 m, 1 Apr 1986 (bud), A. Gentry et al. 53881 (COL, MO, US), 3 Apr 1986 (pist. fl, fr), A. Gentry et al. 53960 (COL, MO, US); 15 km NE de Algeciras, cerca del Campamento La Gironda, 2,400–2,850 m, 26 Mar 1944 (stam. fl) E. Little 7481 (COL, NY, US); Mpio. San José de Isnos, Vereda El Hornito, 1,960–2,000 m, 23 Jul 1980 (stam. fl), G. Lozano 3366 (COL); Mpio. La Argentina, arriba de Finca Palmira, 2,100 m, 26 Sep 1984 (fl bud), G. Lozano et al. 4133 (COL). Cauca: Moscopán, margen del Río San José, La Chorrera de Candelaria, 2,100–2,350 m, 1 Feb 1947 (fr), J. Cuatrecasas 23583 (COL, F, NY, US); Cuenca del Río La Plata, 43 km SE de Popayán, 2,160 m, 26 Nov 1944 (stam. fl), F.R. Fosberg 22376 (NY, US). ECUADOR. Santiago-Zamora: along Quebrada Honda, vicinity of Rancho Achupallas, 2,500–2,700 m, 10 Oct 1943 (stam. fl), J. Steyermark 54552 (NY). Zamora-Chinchipe: Hill ca. 2 km downstream from Campamento Shaime along Río Nangaritzá, 900 m, 15 Feb 1994 (fr), H. van der Werff 13074 (BRIT, MO, QCNE).

*Cybianthus cuatrecasasii* is unique within subgenus *Conomorpha* because of its infundibuliform corolla and subapical portions of the filaments adnate to the corolla lobe. The overlapping covering scales of the abaxial leaf surface, branchlets and inflorescence rachis is found otherwise only in *Cybianthus crotoides* (Mez) G. Agostini, a species endemic to the Guayana Highland. This species has been confused with *Cybianthus peruvianus* (Mez) G. Agostini,

but is easily separated from it by the infundibuliform corolla, long pedicels and eglandular connectives. *Cybianthus cuatrecasasii* is closely related to *C. laetus* (Mez) G. Agostini and *C. occigranatensis* (Cuatrec.) G. Agostini, from which it is easily distinguished by its infundibuliform corolla, apical portions of the filaments adnate to the corolla and lack of lobes on the staminal and staminodial tubes.

**III. Cybianthus subgenus Laxiflorus** G. Agostini, Acta Biol. Venez. 10:144. 1980; Pipoly, Brittonia 35:61–80. 1983. *Conomorpha* section *Conomorphida* Miq., Stirp. Surinam Select. 111. 1851, *pro parte*. *Conomorpha* subgenus *Economorpha* Mez in Engl., Pflanzenr. IV. 236(Heft 9):254. 1902, *pro parte minore*. TYPE SPECIES. *Conomorpha laxiflora* (Mart.) A. DC. = *Cybianthus spicatus* (H. B. K.) G. Agostini. (LECTOTYPE: by Agostini, Acta Biol. Venez. 10:144. 1980).

Terrestrial dioecious shrubs or small trees. Roots positively geotropic. Trunk distinguishable, leptocaulous, the growth dynamics following Rauh's Architectural Model (Hallé et al. 1978). Branchlets tomentose, with dendroid or stellate ferruginous trichomes or both. Cataphylls and pseudocataphylls absent. Leaves alternate, petiolate, tomentose, glabrescent. Inflorescence a simple raceme or rarely a spike, the peduncle 0.1–0.5 cm long, the staminate rachis tortuous or lax, the pistillate rigid and erect or rarely lax. Flowers 4- or 5-merous; calyx cylindric, valvate, epunctate, inconspicuously pellucid or conspicuously brown or orange punctate, glabrous, tomentose, or glandular-granulose, rarely bearing translucent glandular scales, the margins glandular-ciliate; corolla campanulate, the lobes valvate, glandular-granulose only along margins without, but over the entire surface within, epunctate or inconspicuously pellucid or conspicuously brown or orange punctate, and punctate-lineate, medially and basally glabrous, glandular-granulose or with a few stellate trichomes; stamens and staminodes with filaments basally con-nate into a conspicuous or inconspicuous tube, the tube elobate or bearing small lobes alternate with the apically free filaments, the anthers elongate, triangular, distally curved, rarely erect, dorsifixed 1/4–1/2 from base, apically acute, basally cordate, dehiscent by wide longitudinal slits; staminodes resembling stamens but reduced in size, the sterile anthers without pollen or at times producing abortive pollen; pistil obnapiform, the ovary translucent glandular-lepidote, the style short, truncate with a punctiform stigma; pistillode lageniform, the ovary translucent glandular-lepidote, hollow the style elongate and curved apically, the nonfunctional stigma capitate. Fruit drupaceous, one-seeded, the exocarp thin.

*Cybianthus* subgenus *Laxiflorus* contains 6 species, 3 of which have been recorded from Peru. To date, none are known from Ecuador, but we may expect *Cybianthus spicatus* (Kunth) G. Agostini in sandstone areas in the Cordillera del Cóndor area.

## KEY TO SPECIES OF CYBIANTHUS SUBGENUS LAXIFLORUS

1. Inflorescence rachis black punctate; calyx lobes coriaceous, deltate, medially carinate, basally rugose; fruit depressed-globose, broader than long; large trees to 18 m tall, *terra firme* "varillal seco" [dry, on white sand] forests. .... 12. *C. nestorii*
1. Inflorescence rachis epunctate; calyx lobes chartaceous, widely to narrowly ovate-triangular, medially thickened but flar; basally smooth; fruit globose, as broad as long; shrubs or small trees to 10(–12) m tall; riparian gallery forests, either periodically flooded (várzea or igapó) or "varillal húmedo" [wet, white or brown sand] forests.
  2. Leaf blades chartaceous, the tertiary veins prominently raised above; calyx lobes longer than broad; staminal and staminodial tubes inconspicuous; receptacle or pedicel or both enlarged in fruit; seasonally inundated forests (várzea or igapó) ..... 13. *C. spicatus*
  2. Leaf blades coriaceous, the tertiary veins not visible from above; calyx lobes broader than long; staminal and staminodial tubes conspicuous; neither receptacle nor pedicel enlarged in fruit; forests with poor drainage on sand, but non-inundating, ("varillal húmedo") ..... 14. *C. fulvopulverulentus* subsp. *magnoliifolius*

12. *Cybianthus nestorii* Pipoly, sp. nov. (Fig. 15). TYPE: PERU. LORETO: Prov. Maynas, Mishana, on Río Nanay,  $03^{\circ} 55' S$ ,  $73^{\circ} 35' W$ , 150 m, 20 Jan 1985, R. Vásquez & N. Jaramillo 6122 (HOLOTYPE: MO; ISOTYPES: AMAZ, F, NY, US, USM).

Ob folia coriacea, rhachides inflorescentiales atro-punctato-lineares, lobis calycinis deltatos inter se aequilatios coriaceosque, *C. deltato* valde arce affinis sed ab ea habitu arboreo (non fruricoso) usque ad 18 (non 3) m, laminis anguste ellipticis vel anguste oblanceolatis vel anguste oblongis (non obovatibus) 9.5–18(–28), (nec 3.2–4.4) cm longis, 3.2–4.6 (nec 1.7–2.8) cm latis, inflorescentiis 5–7 (non 1–4.2) cm longis, lobis calycinis 1.8–2 (non 1.3–1.7) mm longis, carinatisque (nec planisque) denique secus marginem minute erosio (nec undulatis), statim separabilis.

*Tree to 18 m tall. Branchlets terete, 5–7(–15) mm diam., appressed ferruginous dendroid tomentose. Leaves alternate; blades thinly coriaceous, narrowly elliptic to narrowly oblanceolate, rarely narrowly oblong, (9.5–) 11.5–14(–18) cm long, (3.2–)4–6 cm wide, apically obtuse, emarginate, rounded or acute, basally acute to attenuate, decurrent on the petiole, glabrous and nitid above, glabrous and nitid but pallid below, midrib slightly raised above, prominently raised below, decurrent through length of petiole above and below, the secondary veins (14–)20–47 pairs, prominulous (slightly raised) above and below, inconspicuously pellucid punctate and punctate lineate below, the margin entire, glabrous, revolute; petioles marginate, (2.2–)2.5–3.2(–3.7) cm long, glabrous. Staminate inflorescence: unknown. Pistillate inflorescence: an erect raceme, 5–7 cm long, the rachis black punctate-lineate, ferruginous glandular-granulose, glabrescent; floral bracts coriaceous, linear, minute, 1–1.1 mm long, 0.2–0.3 mm wide, apically acute, densely glandular-granulose below, glabrescent, the margin glandular-cili-*

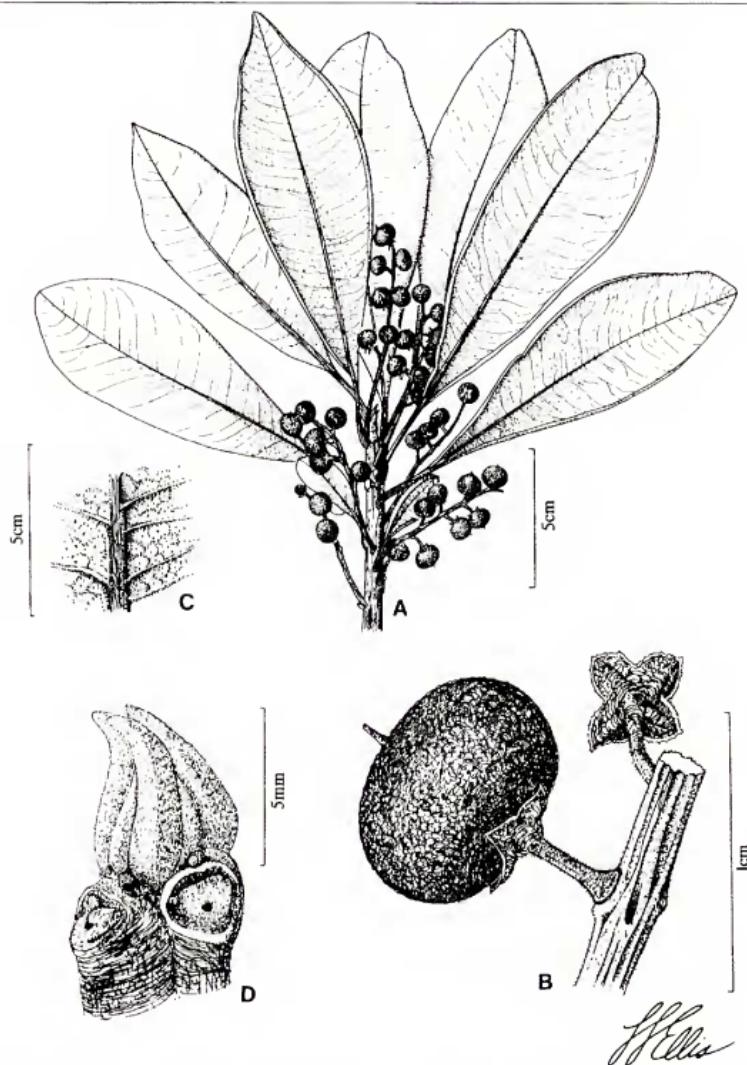


FIG. 15. *Cybianthus nestorii* Pipoly. A. Habit, showing depressed-globose fruits and leaf blades with prominulous secondary veins and revolute margins. B. Portion of infructescence, showing depressed-globose fruit and carinate, rugose calyx lobes with erose, sparsely glandular-ciliolate margins. C. Abaxial leaf surface, showing prominently raised midrib and prominulous secondary veins. D. Branchlet apex, showing appressed dendroid tomentum. A–D, drawn from holotype, by Linda Ellis.

ate; fruiting pedicels cylindrical, 2–4 mm long, densely glandular-granulose, minutely black punctate apically. *Pistillate flowers* unknown; fruiting calyx coriaceous, 1.8–2 mm long, the tube 0.3–0.5 mm long, the lobes deltate, 1.3–1.6 mm long, 1.4–1.7 mm wide, apically acute, medially carinate, rugose basally, the margin minutely erose, sparsely glandular-ciliolate; corolla, staminodes and pistil unknown. *Fruit* depressed-globose, 4–6 mm long, 6–8 mm diam., black at maturity, inconspicuously pellucid punctate.

*Distribution*.—Known only from the Río Nanay Drainage Basin, Maynas Province, Department of Loreto, Peru, at 150 m elevation.

*Ecology and conservation status*.—*Cybianthus nestorii* occurs in “varillal seco” habitats, consisting of tall *terra firme* (non-inundating), relatively dry forest on deep white sands. It is a rare species and thus, should be considered threatened.

*Etymology*.—It is a pleasure to dedicate this species to Nestor Jaramillo, of Iquitos, Peru, prodigious collector, and authority on plant collecting in tropical forests. Nestor, with his supervisor, Rodolfo Vásquez, form one of the most formidable botanical exploration teams in South American botany.

**PARATYPES:** PERU. Loreto: Prov. Maynas, Drto. Iquitos, Puerto Almendras, UNAP, Tree No. 324, Tree inventory, 03° 48' S, 73° 25' W, 122 m, 17 Jan 1993 (ster.), C. Grández, N. Jaramillo et al. 5321 (BRIT, MO, UNAP), Tree No. 373 (ster.), C. Grández, N. Jaramillo et al. 5370 (BRIT, MO, UNAP, USM); Tree No. 651 (ster.), C. Grández, N. Jaramillo et al. 5642 (BRIT, MO, UNAP).

*Cybianthus nestorii* is unique within the subgenus because of its autapomorphic depressed-globose fruits and carinate calyx lobes. Other characters which readily separate it from its closest relative, *Cybianthus deltatus* Pipoly, of the Río Guainía drainage basin of Venezuela, include its much larger arborescent habit, larger elliptic to narrowly oblanceolate leaves, longer inflorescences, and longer, minutely erose calyx lobes.

13. *Cybianthus spicatus* (Kunth) G. Agostini (Fig. 3B), Acta Biol. Venez. 10:146. 1980. *Myrsine spicata* Kunth in H.B.K., Nov. Gen. Sp. 3:250. 1818. *Conomorpha spicata* (Kunth) Mez in Engl., Pflanzent. IV. 236(Heft 9):259. 1902. TYPE: VENEZUELA. TERRITORIO FEDERAL AMAZONAS: In inundated area along the Río Atabapo, without date (stam. fl), A. von Humboldt & A. Bonpland 1096 (HOLOTYPE: P-BON; ISOTYPE: B-destr.).

*Wallenia laxiflora* Mart., Nov. Gen. Sp. Pl. 3:89. 1829. *Conomorpha laxiflora* (Mart.) A. DC., Trans. Linn. Soc. London, Bot. 17:102. 1834. TYPE: BRAZIL. AMAZONAS: Prov. Rio Negro, “In sylvis Japurensibus,” Jan 1826 (stam. fl), C. Martius s.n. (LECTOTYPE by Pipoly 1983b: M; ISOLECTOTYPE: CGE).

*Conomorpha laxiflora* var. *longifolia* Miq. in Mart., Fl. Bras. 10:302. 1856. TYPE: BRAZIL. AMAZONAS: Prov. Rio Negro, vicinity Barra [Manaos], Dec-Mar 1850–51 (stam. fl), R. Spruce 1040 (LECTOTYPE, here designated: M; ISOLECTOTYPES, CGE, GH, GOET, K, LD, LE, OXF, U).

*Conomorpha laxiflora* var. *latifolia* Miq. in Mart., Fl. Bras. 10:303. 1856. *Conomorpha latifolia* (Miq. in Mart.) Mez in Engl., Pflanzent. IV. 236(Heft 9):255. 1902. TYPE: VENEZUELA.

[GUYANA]. 1839 (stam. fl), *R. Schomburgk* 1002 (LECTOTYPE by Pipoly 1983b: G; ISOLECTOTYPE: CGE).

*Conomorpha candelleana* Mez in Engl., Pflanzenr. IV. 236(Heft 9): 256. 1902. TYPE: VEN-  
EZUELA. [GUYANA]. 1840 (stam. fl), *R. Schomburgk* 885 (HOLOTYPE: B-destroyed;  
fragment at F; LECTOTYPE, here designated: G; ISOLECTOTYPES: CGE, GH, K-2 sheets,  
US, W).

*Conomorpha grandiflora* Mez in Engl., Pflanzenr. IV. 236(Heft 9):258. 1902. TYPE:  
BRAZIL. AMAZONAS: Rio Negro, above Moura, Dec 1851 (stam. fl.), *R. Spruce* 1946  
(HOLOTYPE: B- destroyed; LECTOTYPE, here designated: K; ISOLECTOTYPES: CGE, GH,  
GOET, LD, LE, NY, OXF).

*Conomorpha glauca* Mez in Engl., Pflanzenr. IV. 236(Heft 9):260. 1902. TYPE: BRAZIL.  
AMAZONAS: Rio Negro, about 00° 30' S, 64° 00' W, 24 Jun 1874 (stam. fl.), *J. Tratil*  
508 (HOLOTYPE: K).

*Conomorpha madeirensis* A.C. Smith, J. Arnold Arbor. 20:300. 1931. TYPE: BRAZIL. AMAZONAS:  
Municipality of Humayá, between Monte Cristo and Sta. Victoria on Rio Irixuna,  
15–17 Nov 1934 (stam. fl.), *B. Kruckoff* 7240 (HOLOTYPE: NY; ISOTYPES: A, F, M, MAD-  
Y, MICH, MO, S, US).

*Conomorpha gracilis* A.C. Smith, Bull. Torrey Bot. Club 67:295. 1940. TYPE: GUYANA.  
Arubaru River, Kako Territory, Upper Mazaruni drainage, 600 m, 2 Feb 1939 (stam.  
fl.), *A. Pinkus* 181 (HOLOTYPE: NY; ISOTYPES: BR, F, GH, M, MO, NY, S, US).

*Shrub or small tree* to 12 m tall. *Branchlets* thin to moderately thick, (3.5–)  
4–8(–20) mm diam., appressed to floccose-dendroid and stellate ferruginous  
tomentose, the stellate hairs often appearing furfuraceous, glabrescent.  
*Leaves* alternate; blades thinly coriaceous to chartaceous, to membranaceous,  
ovate, elliptic, obovate or rarely oblanceolate, (4.5–)6–17.5(–21) cm long,  
2.9–8(–11.5) cm wide, apically acute, rounded, obtuse or rarely emarginate,  
basally acute to cuneate, glabrous, pustulate and often nitid above, sparsely  
ferruginous puberulent and minutely glandular-lepidote below, the mid-  
rib, secondary and tertiary veins prominently raised above and below, the  
midrib decurrent to the base of the petiole, pellucid or black punctations  
obscure below, the margin slightly revolute, entire; petioles distinctly marginate,  
(1–)1.5–3.2(–4) cm long, stellate and dendroid ferrugineous tomentose, early  
glabrescent. *Staminiate inflorescence*: a simple raceme, lax, (3–)6–9(–12.5) cm  
long, the rachis epunctate, glandular-granulose with scattered stellate and  
dendroid ferrugineous trichomes, glabrate; floral bracts chartaceous, linear-  
lanceolate, 0.7–1.7(–2.2) mm long, densely ferrugineous tomentose, early  
caducous; pedicels cylindrical, 0.9–2.1(–3) mm long, glabrous to densely  
glandular-granulose. *Staminiate flowers* (4–)5-merous, chartaceous, cream to  
yellow, with a sweet odor; calyx shallowly coryliform, 1.5–2.5 mm long,  
the tube 0.3–0.6 mm long, glandular-granulose at first, glabrescent, the  
lobes ovate or ovate-triangular, (1.2–)1.4–2 mm long, 0.9–1.3 mm wide,  
acute to abruptly acuminate apically, somewhat cordate basally, prominently  
thickened medially, conspicuously punctate, the margins mostly entire, but  
occasionally erose apically, glandular-ciliate; corolla campanulate, 3.6–4.8  
mm long, the tube 1–1.2 mm long, the lobes ovate, 2.1–3.4 mm long, 1.2–

2.6 mm wide, slightly reflexed at anthesis, obtuse to acute apically, epunctate or conspicuously brown punctate; stamens 1.6–2.2 mm long, the tube membranaceous, inconspicuous, 1–1.5 mm long, the apically free portions of the filaments 0.3–0.55 mm long, the anthers elongate-triangular, 0.7–1.2 mm long, 0.2–0.3 mm wide, dorsifixed ca. 1/3 from base, apically acute, basally cordate, distally recurved, the connective inconspicuously brown punctate; pistillode lageniform, 1.3–1.8 mm long, the ovary 0.6–0.9 mm long, 0.5–0.75 mm diam., densely translucent glandular-lepidote, the style elongate, 0.8–1.3 mm long, slightly curved apically, the stigma capitate, 0.1–0.2 mm long. *Pistillate inflorescence* as in staminate, erect, (3.3)–4.5–13(–17.5) cm long; floral bracts 0.5–2.4 mm long; pedicels 1.3–1.8 mm long, accrescent in fruit to 3.1 mm long, the receptacle or pedicel or both incrassate in fruit. *Pistillate flowers* as in staminate but chartaceous, yellow; calyx cotyliform, 1.3–1.9 mm long, the tube 0.6–0.9 mm long, the lobes widely to narrowly ovate, 1.1–1.7 mm long, 0.9–1.5 mm wide, erect, sparsely brown punctate, prominently thickened below, the margins entire or occasionally erose apically; corolla 2.7–3.5 mm long, the tube 0.7–0.9 mm long, the lobes 1.6–2.7 mm long; staminodes as in stamens but 1.6–2.1 mm long, the tube chartaceous, conspicuous, 0.7–1.1 mm long, the apically free portions of the filaments 0.3–0.5 mm long, the antherodes 0.6–0.9 mm long, 0.2–0.3 mm wide, at times producing abortive pollen; pistil obnapiform, 1.6–2.2 mm long, the ovary 0.8–1.2 mm long, 0.9–1.2 mm diam., densely translucent glandular-lepidote, the placenta cupuliform, ovules 4, partially imbedded, the stigma capitate, 0.1–0.2 mm long. *Fruit* globose, 2.5–6 mm long and in diam., prominently black punctate-lineate, with a few persistent lepidote glandular scales below the usually persistent style base, green then purple, then black.

*Distribution.*—Venezuela, Colombia, Peru, Brazil and Guyana, in inundated forests (várzea and igapó), from 100–400 m.

*Ecology and conservation status.*—*Cybianthus spicatus* is restricted to primary riparian habitats on white sandy soils. It is common in igapó and várzea, but the latter only when sufficient quantities of sand exist, a mixed várzea type. While it is a widespread species, it is sensitive to soil compaction, and should be considered threatened.

*Etymology.*—The epithet refers to the inflorescence shape, which is a raceme bearing flowers on short pedicels, thus appearing spicate.

Representative specimens examined. PERU. Huánuco: Cerros del Sirá, SW slope of the Río Lulla Pichís, 1190 m, 12 Jul. 1969 (fr), J. Wolfe 12295 (F, NA); 100 m, 22 Jul 1969 (fr), T. Dudley 13124 (F, NA); Prov. Pachitea, region of Pucallpa, W part of Sirá Mountains and adjacent lowland, ca 24 km SE to 26 km ESE of Puerto Inca, next to Campamento Pato Rojo, 09° 27' S, 74° 46' W, 1,000 m, 27 Jan 1988 (pist. fl), W. Morawetz & B. Wallnöfer 12-27188 (BRIT, MO, W, WU), 1,320 m, 1 May 1988 (fr), B. Wallnöfer 111-1588 (BRIT, W, WU), 1,230 m, 13 Jun 1988 (fr), B. Wallnöfer 112-13688 (BRIT, W, WU). San Martín:

Lamas, on old trail from San Antonio de Cumbasa, S of Shapajilla, upper slopes of Cerro Isco, 06° 22' S, 76° 23' W, 600–800 m, 5 Oct 1986 (bud), S. Knapp et al. 8514, (fr), S. Knapp et al. 8517 (MO, US, USM).

*Cybianthus spicatus* is a polymorphic ochlospecies, sensu White (1962), Prance (1972) and Pipoly (1983a), with many semi-isolated populations throughout the Amazon and eastern Guayana Floristic Province (Maguire 1979). These localized populations have produced several seemingly distinct ecotypes, resulting in overdescription. Collections of *Cybianthus spicatus* from Peru match the type of *Conomorpha gracilis* A. C. Smith, described from Guyana, in every detail. Fieldwork conducted in Guyana, Venezuela, Brazil and Peru since my earlier treatment (Pipoly 1983a), where I discuss the four ecotypes present within the species, and the synonymy rationale, has confirmed the concept that *Cybianthus spicatus* is a polymorphic ochlospecies.

Steyermark (1981) discussed the fact that Richard Schomburgk's collections attributed to Guyana are now known to be from Venezuela.

**14. *Cybianthus fulvopulverulentus* (Mez) G. Agostini subsp. *magnoliifolius* (Mez) Pipoly (Fig. 3A), Brittonia 35:72. 1983. *Conomorpha magnoliifolia* Mez in Engl., Pflanzenr. IV. 236(Heft 9):258. 1902. *Cybianthus magnoliifolius* (Mez) G. Agostini, Acta Biol. Venez. 10:146. 1980. TYPE: SURINAME. without locality, (stam. fl), H. Kegel 244 (LECTOTYPE by Pipoly 1983a: GOET).**

*Conomorpha rigida* Mez, Repert. Spec. Nov. Regni Veg. 16:420. 1920. syn. nov. TYPE: BRAZIL. AMAZONAS: "Hylaea," without date (fr), E. Ule 8722 (HOLOTYPE: B-destr, F Neg. 4831). Despite searches of herbaria housing significant Ule collections, no duplicates of the type have been located. Therefore, I select a neotype herewith: TYPE: GUYANA [BRITISH GUIANA]. Orella Savanna, Corentyne River, Sep 1879 (fr), E. Imthurn B/9 (NEOTYPE here designated: K; ISONEOTYPE: BRG). The neotype was annotated by Mez in 1901, but was not mentioned in the protologue.

*Shrub or tree to 10 m tall. Branchlets mostly thick, (3–)5.2–12 mm diam., glabrate or densely stellate and dendroid ferruginous tomentose and glandular-granulose, at times glabrescent. Leaves alternate, at times clustered and approaching pseudoverticillate; blades coriaceous, elliptic, oblanceolate, ovate or obovate, 7.2–21.7 cm long, (2.2–)3.6–9.5(–17.1) cm wide, apically obtuse, acute, rounded or emarginate, basally obtuse to acute (rarely acuminate), sparsely pitted with superimposed glandular lepidote scales and glabrous or glandular-granulose, at times sparsely ferruginous tomentose above and below, glabrescent, epunctate, the margin entire and revolute; petioles marginate, (1.3–)1.6–4.2(–4.6) cm long, ferruginous tomentose, and glandular-granulose, glabrescent. Staminate inflorescence: a simple, tortuous raceme, rarely lax, (3.6–)4.5–15 cm long, the rachis maroon, opaque, glandular-granulose or with a few scattered dendroid ferruginous trichomes, glabrescent; floral bracts chartaceous, linear-lanceolate, 0.8–3.6 mm long, ca. 0.1–0.2 mm wide, densely ferruginous tomentose, caducous; pedicels cylindrical, (0.2–)2.9–3.6 mm*

long, densely glandular-granulose, glabrescent. *Staminate flowers* 4- or 5-merous, chartaceous, white, cream or yellow; calyx deeply cotyliform, 0.9-2.6 mm long, densely glandular-granulose then glabrescent, the tube 0.3-0.7 mm long, unequally divided, the lobes chartaceous, ovate to ovate-triangular, 0.6-1.9 mm long, 1.1-2.4 mm wide, obtuse to acute or acuminate apically, prominently orange punctate, densely ferrugineous tomentose and ferrugineous glandular-granulose or partially glabrescent or ferrugineous glandular-granulose and then sometimes totally glabrescent, the margins extremely undulate, entire, densely glandular-ciliate; corolla campanulate, (2.8)-3.3-4.7(-5.5) mm long, the tube (0.6)-0.9-1.4(-1.7) mm long, the lobes ovate, (2)-2.2-3.1(-4) mm long, (1.2)-1.5-2.4(-2.8) mm wide, the lobes highly reflexed at anthesis, obtuse to acute apically, conspicuously orange punctate and punctate-lineate, at times scattered ferrugineous trichomes before anthesis without, the margin entire; stamens (2.4)-2.8-3.4 (-3.8) mm long, the staminal tube 0.8-1.1 mm long, the apically free portions of the filaments 0.6-0.9 mm long, the anthers elongate-triangular, (0.8)-1-1.4 mm long, apically acute, basally cordate, dorsifixed ca. 1/4 from base, distally recurved or rarely and aberrantly erect; pistillode (1.6)-1.9-2.5 mm long, the ovary 0.7-1.1 mm long, 0.7-1.2(-1.4) mm diam., densely translucent glandular-lepidote, the style elongate, curved, 1-1.6 mm long, the stigma 0.1-0.2 mm long. *Pistillate inflorescence* as in staminate but erect (3)-4-11.4 cm long, the rachis green then red; floral bracts 0.7-2.9 mm long, ca. 0.1-0.2 mm wide; pedicels cylindrical, (0.2)-0.6-1.5(-2) mm long. *Pistillate flowers* as in staminate but dull yellow to brown; calyx 1.2-2.6 mm long, the tube 0.4-0.7(-1) mm long, the lobes 0.7-2 mm long, 1.3-2.4 mm wide; corolla (2.7)-3.2-3.5(-4) mm long, the tube 0.6-1.2 mm long, the lobes 2-2.3(-2.6) mm long, 1.1-1.5 mm wide; staminodes as in stamens but 2.4-2.9 mm long, the staminodial tube 0.7-0.9 mm long, the apically free portions of the filaments 0.7 mm long, the antherodes triangular, 0.6-0.9 mm long; pistil obnapiform, 1.9-2.5(-3) mm long, the ovary (0.7)-0.9-1.6 mm long, (0.7)-1.3-1.7(-2.2) mm diam., densely translucent glandular-lepidote, the style thick, (0.4)-0.6-0.9(-1.3) mm long, the stigma pseudocapitate, very minutely 4-lobed, up to 0.3 mm long. *Fruit* globose, 3-9 mm long and in diam., green, then red, then black, inconspicuously pellucid punctate.

*Distribution*.—Venezuela, Guyana, Surinam, French Guiana, Brazil (Amazonas, Roraima, Pará, Mato Grosso) and reported here for the first time from Peru and Bolivia 50-500(-850) m.

*Ecology and conservation status*.—*Cybianthus fulvopulverulentus* subsp. *magnoliifolius* is extremely common in wet tepuí savannas, but is rare in Peru in varillal húmedo (wet sandy, non-inundating) habitats. It is anticipated, but has not yet been collected, in Ecuador.

*Etymology*.—The epithet, 'fulvopulverulentus' refers to the rusty tomen-

tum of the species, forming a powdery like vestiture on the adaxial leaf surface, caducous as the leaf matures. The subspecific epithet refers to the shape and shiny adaxial leaf surface, giving the general impression of a *Magnolia* leaf.

Specimens examined. PERU. Loreto: Prov. Maynas, Iquitos, Nina rumi-Río Nanay, 03° 48' S, 73° 25' W, 122 m, 5 Mar 1987 (bud), R. Vásquez et al. 8905 (AMAZ, MO, US, USM). BOLIVIA. Santa Cruz: Prov. Velasco, Parque Nacional Noel Kempff Mercado, Campamento Huanchaca I, 3.35 km from Río Pauserna, 13° 56' 01" S, 60° 49' 30" W, 600 m, 22 May 1994 (fr), L. Arroyo et al. 738 (BRIT, MO, USZ), 26 Jul 1995 (pist. fl), T. Killeen et al. 7528 (BRIT, MO, USZ), (stam. fl), T. Killeen et al. 7530 (BRIT, MO, USZ), 850 m, 3 Nov 1995 (fr), A. Rodríguez & J. Shrubb 669 (BRIT, MO, USZ).

Specimens cited here are the first known from Peru and Bolivia. Those collections represent remarkable disjunctions, the closest population known heretofore occurring approximately one degree north of the Rio Negro in southern Venezuela near the Brazilian frontier, or halfway across Brazil to the east, on Serra do Cachimbo, state of Mato Grosso. To date, no specimens are known from Ecuador.

In my previous treatment (Pipoly 1983a), I included *Conomorpha rigida* in the synonymy of *Cybianthus fulvopulverulentus* (Mez) G. Agostini subsp. *fulvopulverulentus*. The type at Berlin had been destroyed and I synonymized it based on the description and photo. However, the discovery of two duplicates of the Imthurn gathering annotated by Mez permitted neotypification of the name with the Kew specimen and its inclusion here. Populations represented by this collection differ from the type of subspecies *magnoliifolius* only in their diminutive stature and vegetative parts.

**IV. Cybianthus subgenus Comomyrsine (Hook. f.) G. Agostini, Acta Biol. Venez. 10:162 1980. *Comomyrsine* Hook. f. in Benth. & Hook., Gen. Pl. 2:643. 1876; *Weigelia* A. DC. subgenus *Comomyrsine* (Hook. f.) Mez in Engl., Pflanzenr. IV. 236(Heft 9):290. 1902. Pax in Engl. & Prantl, Nat. Pflanzenfam. IV, 1:92. 1897; J.F. Macbr., Field Mus. Nat. Hist., Bot. Ser. 13 (5, I):175. 1959. TYPE SPECIES: *Cybianthus sprucei* (Hook. f.) G. Agostini (LECTOTYPE: by D'Arcy, Ann. Missouri Bot. Gard. 60:445. 1973.)**

Terrestrial, erect, monoaxial *subshrubs* or *treelets* to 2(–5) m tall. Roots positively geotropic. Bark mostly brown, smooth, longitudinally fissured or transversely checked. Trunk distinguishable, leptocaulous, monoaxial, following morphogenetic dynamics of Corner's Architectural Model (Hallé et al. 1978), growth rhythmic. Stems terete distally, sparingly to densely glandular-papillate, at times with rufous hydropotes or orange glandular lepidote scales, without lenticels. Cataphylls alternate or pseudoverticillate, alternating with pseudoverticels of leaves, or apparently axillary to them, linear-subulate to acicular, rigid to membranous, keeled or flat, prominently punctate or punctate-lineate, glabrous, glandular-papillate, bearing hydropotes, or orange lepidote scales. Leaves pseudoverticillate or alternate, apically acute to rounded, often mucronulate, basally symmetric or asymmetric, acute, obtuse, or ta-

pering, rarely auriculate, the venation camptodromous, to brochidodromous, apically acute or attenuate to rarely rounded, mucronulate or not, basally acute, cuneate, or rarely obtuse, at times subauriculate, symmetric or asymmetric, black or pellucid punctate, bearing hydropotens, at times with orange glandular lepidote scales or glandular papillae, the margin opaque or scarious, entire, subentire, undulate and sparse dentate or pectinate-dentate, flat or inrolled, the teeth vascularized or not; petioles pulvinate (basally swollen), canaliculate, except rarely marginate distally. *Inflorescence* pinnately to tripinnately paniculate, (rarely reduced to a pseudoraceme), pyramidal to columnar, the branches spicate or racemose (rarely glomerulate); inflorescence bract linear-subulate, indistinguishable from the cataphylls; branch bracts membranous, linear, subulate; floral bracts linear-lanceolate, subulate, subtending or rarely on the pedicel, variously punctate, glandular-papillate or glabrous; pedicels terete, thin, or obsolete. *Flowers* unisexual or bisexual, 4–5(–6)-merous, homomerous or heteromerous; calyx coryliform, at times unequally divided, the lobes valvate, spreading, linear-subulate or rarely subdeltate, apically acute, attenuate or rarely premorse, pellucid to black punctate, the margin entire or erose-serrulate, glabrous or glandular-ciliate; corolla rotate to subrotate, the lobes valvate, linear-subulate, apically acute, rounded or attenuate, essentially glabrous without, densely glandular-granulose throughout within, pellucid or black punctate, the margin irregular, entire; stamens and staminodes similar, the staminodes reduced in size, partially connate to form a conspicuous or inconspicuous tube, at times bearing lobes alternating with apically free filaments, the tube adnate to the corolla, at times so as to mimic epipetalous stamens, the apically free portions of the filaments terete or flat, glabrous or glandular-granulose, the anthers dorsifixed, as wide or wider than long, apically rounded, obtuse or emarginate, basally cordate to deeply cordate, dehiscent by wide longitudinal slits; pistil obpyriform, subglobose, obturbinate or clavate, the ovary terete, sparsely to densely translucent glandular lepidote, glandular-papillate or glabrous, the placenta umbonate, 2–3(–4)-ovulate, the ovules immersed in the placenta ca. 1/2 their length, the style short or vestigial, the stigma large, capitate, the margin lacinate, the lacinae with large lobes, the stigma early caducous. *Fruit* globose to depressed-globose, the exocarp sometimes fleshy, the mesocarp and endocarp stony, black or pellucid punctate, one-seeded, the testa corrugate, the embryo cylindrical, transverse.

*Distribution.*—From the Darién of Panama southward through the Andes of Colombia, Ecuador, Peru and Bolivia to Rondônia, Brazil, at elevations of sea level–2,200 m elevation.

*Ecology.*—Members of *Cybianthus* subgenus *Comomysine* occupy the forest floor, growing in sheltered areas under cliffs, and in other shady areas. The monoaxial stems are weak and break easily when trampled. They are

extremely sensitive to soil compaction and occur mostly in areas where leaf litter accumulates.

Pipoly (1987) demonstrated that *Cybianthus* subgenus *Comomysine* is most closely related to subgenus *Triadophora* by the monoaxial habit. The cataphylls of *Comomysine* without petiolar structures, as opposed to the petiolate pseudocataphylls found in subgenus *Triadophora*, serve to further distinguish *Comomysine*. Likewise, the caducous, oversized stigma with laciniate lobes is unique to subgenus *Comomysine*. The subgenus contains 8 species, of which 7 occur in Ecuador and Peru.

#### KEY TO SPECIES OF *CYBIANTHUS* SUBGENUS *COMOMYSINE*

1. Leaves 5.7–29 cm long; stems less than 1 cm diameter.
  2. Stems apices bearing orange hydropotes; leaf blades linear-lanceolate, 1.6–4.0 cm wide, the margin repand to undulate; petioles 0.6–1.0 cm long; inflorescence pseudoracemose, the flowers glomerulate. .... 15. *C. verticilloides*
  2. Stem apices bearing rufous glandular-papillate or with rufous hydropotes; leaf blades ovate, obovate, oblanceolate, elliptic, or oblong, (4.0–), 10–22(–30) cm wide, the margin regular, entire or minutely straight-serrulate; petioles (1.0–)1.5–5(–21) cm long; inflorescence pyramidal-bipinnate paniculate, or a columnar thyrsoid panicle, never a pseudoraceme, the flowers spicate, corymbose, or rarely cymose.
    3. Stem apices sparsely glandular-papillate, bearing rufous hydropotes; leaf bases broadly rounded, the margins scarious; petioles progressively longer acropetally along the stem, 2.0–4.5 cm long; inflorescence paniculate, the flowers corymbose; pedicels 1.0–2.5 mm long; sepals deltate; petals cucullate apically, the margin glandular-granulose; filaments glabrous. .... 16. *C. croatii*
    3. Stem apices densely glandular papillate, without hydropotes; leaf bases acute, to acute with a rounded base, the margins opaque; petioles subequal along stem, slightly shorter acropetally, 1.6–2.0 cm long; inflorescence pinnately paniculate, the flowers spicate or racemose; pedicels absent; sepals ovate-lanceolate; petals flat, the margin glabrous; filaments glandular granulose. .... 17. *C. humilis*
1. Leaves (16–)31–105 cm long; stems 1–5 cm diameter.
  4. Leaves oblong to elliptic, apically rounded or rarely acute, not mucronulate, basally abruptly acute to broadly rounded; petioles ((2.5–)5 cm long; flowers homomerous, 4– or 5-merous.
    5. Shrub or tree to 5 m tall; inflorescence a pyramidal panicle, the branches spicate, the flowers sessile to subsessile; leaf base symmetric; cataphylls (2.5–) 3.5–5.0 cm long. .... 18. *C. sprucei*
    5. Semi-woody shrubs to 1(–3.5) m tall; inflorescence a columnar, thyrsoid panicle, the branches racemose, the flowers on pedicels 2.3–5.0 mm long; leaf base asymmetric; cataphylls 0.6–2.5 cm long. .... 19. *C. simplex*
  4. Leaves oblanceolate, apically acute, mucronulate, basally gradually tapered on the petiole, often subauriculate; petioles 1.5–2 cm long; flowers heteromorous, the calyx 5–6-lobed, the corolla 4–5-lobed.
    6. Leaves chartaceous, 31–55 cm long, the margin flat, entire; cataphylls

- 1.5–4.0(–4.5) cm long; calyx lobes delrate, the margin glabrous; corolla carnosae..... 20. *C. kayapii*
6. Leaves coriaceous, longer than 55–125 cm, the margin inrolled, densely and minutely serrulare; cataphylls 4.0–6.5 cm long; calyx lobes linear-subulate, the margin densely glandular-granulose; corolla membranaceous..... 21. *C. anthuriophyllum*
- 15. *Cybianthus verticilloides* (Cuatrec.) G. Agostini (Fig. 4B), Acta Biol. Venez. 10:165. 1980. *Weigelia verticilloides* Cuatrec., Revista Acad. Colomb. Ci. Exact. 8(31):327. 1951. TYPE: COLOMBIA. VALLE DEL CAUCA: Río Cali riverbed, between Quebrada de Juntas and El Recreo, 2,070–2,260 m, 7 Jul 1946 (stam. fl.), J. Cuatrecasas 21981 (HOLOTYPE: F; ISOTYPE: COL).**

*Shrub* to 1 m tall. *Stem* terete, 5–8 mm diam., sparingly rufous glandular-papillate and bearing orange hydropotes, early glabrescent, the bark horizontally checked. *Cataphylls* chartaceous, subulate, (1.2–)1.5–2.1 mm long, 0.9–2.1 mm wide, flat, apically long-attenuate, basally somewhat decurrent, sparingly glandular-papillate and orange lepidote above and below, black punctate. *Leaves* pseudoverticillate; blades chartaceous, linear-lanceolate, 12–20 cm long, 1.6–4.0 cm wide, apically long-attenuate, basally acute, greyish-green above and pallid green below when fresh (teste Cuatrec.), sparingly rufous glandular-papillate and orange lepidote above and below at first, persistent only below, inconspicuously pellucid-punctate, midrib planar above, prominent below, the secondary veins 8–12 pairs, prominent below, the margin inrolled except revolute basally, undulate to a vascularized blunt tooth at nerve end, translucent throughout its length but not scarious; petioles canaliculate, 0.6–1.0 cm long, 0.5–1.0 mm diam., glabrous, swollen basally at point of attachment. *Staminate Inflorescence*: a pseudoraceme, 10–12 cm long; peduncle ca. 1 cm long, the rachis glandular-papillate, the flowers glomerulate; inflorescence branch bracts membranous, subulate, 5.5–7.0 mm long, 1.2–2.0 mm wide, minutely glandular-papillose puberulent, glabrescent, prominently black lineate-punctate, the margin entire; floral bracts similar to branch bracts except 0.9–2.0 mm long, 0.2–0.5 mm wide; pedicels obsolete to cylindrical to 1.3 mm long, prominently black punctate. *Staminate flowers* 5–6-merous, lilac; calyx membranaceous, subcotyliform, 1.5–2.3 mm long, unequally divided, the tube to 0.2 mm long, the lobes linear-lanceolate, subulate, 1.3–2.0 mm long, 0.4–0.7 mm wide, apically long-attenuate, flat, epunctate, glabrous, the margin irregular, entire, glabrous; corolla rotate, chartaceous, 2.5–4.0 mm long, the tube opaque, 0.8–1.5 mm long, the lobes hyaline, ovate, 2.1–3.0 mm long, 1.4–1.9 mm wide, reflexed 180°, apically acute to rounded, moderately glandular-granulose throughout within except densely so along margin, glabrous without, epunctate, the margin irregular, entire; stamens 3.0–3.5 mm long, the tube 0.8–1.5 mm long, epunctate, elobate, glabrous, the apically free portions of the fila-

ments thick (base of filament as wide as anther), terete, glabrous, 1.5–2.0 mm long, ventrally reflexed apically, the anthers subglobose, wider than long, 0.3–0.5 mm long and wide, apically rounded to obtuse, basally barely cordulate, the connective prominently black punctate dorsally; pistillode ovoid, ca. 0.9–1.3 mm long, 0.6–0.8 mm diam. *Pistillate inflorescence* resembling staminate, but 4.5–6.5 cm long, the glomerules mostly reduced or a single flower; branch bracts and floral bracts identical, membranous, sublate, 2.8–4.0 mm long, 0.7–1.0 mm wide, sparsely glandular-papillate, prominently black punctate, the margin erose; pedicels (1.5–)1.8–3.2 mm long. *Pistillate flowers* as in staminate but white; calyx chartaceous, cotyliform, 2.2–2.7 mm long, hyaline, the tube 0.3–0.4 mm long, the lobes 1.9–2.3 mm long, 0.7–1.1 mm wide, apically attenuate, at times rufous-papillate apically; corolla rotate, 2.5–3.2 mm long, the tube 0.9–1.0 mm long, the lobes widely ovate, 1.6–2.2 mm long, 1.2–1.5 mm wide, apically rounded to acutish, glandular-granulose within and along margin, the margin regular; staminodes similar to stamens but 1.6–1.9 mm long, the tube 0.9–1.0 mm long, the apically free portions of the filaments terete, 0.7–0.9 mm long, the antherodes globose, often malformed, 0.2–0.3 mm long, 0.3–0.4 mm wide, apically obtuse, basally obtuse to rounded or cordulate, the connective prominently black punctate ventrally; pistil obpyriform, 2.1–2.5 mm long, 1.2–1.6 mm diam, the ovary 1.6–1.8 mm long, translucent-lepidote, glandular-papillate, prominently black punctate, style 0.5–0.7 mm long, the stigma capitate, 4–5-lobed, each lobe lacinate, to 0.6 mm long, the placenta deeply cupuliform, 2 ovulate. *Fruit* globose, 7–7.5 mm long and diam., prominently black punctate, exocarp thin.

*Distribution.*—Previously considered endemic to the Western Cordillera of the Andes, on the cliffs (Farallones) of Cali, in the Department of Valle, Colombia, at 1,900–2,600 m, but reported for the first time here from Napo, Ecuador, at 200 m elevation.

*Ecology and conservation status.*—*Cybianthus verticilloides* is a rare species in lowland and premontane forest, growing near watercourses. Given that it has well-known uses, *C. verticilloides* might be suitable for cultivation. However, at present nothing is known regarding its natural population dynamics. Given the rapid urban development around Cali, and its apparent rarity in Ecuador, this species should be considered endangered.

*Etymology.*—The specific epithet refers to the strikingly pseudoverticillate phyllotaxis.

*Local names and uses.*—Colombia: “verticilado” (Spanish); Ecuador: “Carnerupachapanga,” “Yanacarneru” (Quichua), “Carnero Negro” (Spanish). Used to get rid of small fish in the urinary tract that cause bleeding and pain.

Specimens examined. COLOMBIA. Valle del Cauca: Río Cali riverbed, above Río Pichindé, El Robal, 2,640 m, 25 Jul 1946 (fr), J. Cuatrecasas 21721 (COL, F); Peñas Blancas, 2,200

m, 9 May 1940 (stam. fl), A. Figueroa 875 (COL, US); Río Tuluá, 1,200 m, without date (pist. fl), J. Duque-Jaramillo 4022 (COL); El Silencio, Yanaconas, 1,900–2,200 m, 28 Feb 1939 (pist. fl), E. Killip & H. Garcia 33802 (COL, US); Farallones de Cali, 1,800 m, Oct 1883 (pist. fl), F. Lebmann 3027 (K, US); km 18–20, Cali-Buenaventura Hwy, entering near Finca Zingara, summit of the Cordillera Occidental, 1,500–2,000 m, 28 Feb 1988 (fr), H. van der Werff & I. Cabrera 15786 (COL, MO, VALLE). ECUADOR. Napo: Río Napo, S bank a few km below Itaya,  $00^{\circ} 28' S$ ,  $76^{\circ} 33' W$ , 200 m, 20 Aug 1982 (ster.) H. Balslev & Santos Dea 2850 (QCA).

*Cybianthus verticilloides* appears to be most closely related to *C. gondotianus*, by the synapomorphic vascularized leaf teeth. However, *C. verticilloides* is defined by the autapomorphic horizontally checked bark, the orange hydropotes of the branchlets, and the linear-lanceolate leaf shape.

#### 16. *Cybianthus croatii* Pipoly, sp. nov. (Fig. 4A, 16). TYPE: ECUADOR. PASTAZA:

Along Rd. between Diez de Agosto and Atajuno, 18 km NE of main Puyo-Macas Rd., 8.2 km NE of Diez de Agosto,  $01^{\circ} 27' S$ ,  $77^{\circ} 51' W$ , 970 m, 4 May 1984 (stam. fl), T. Croat 59009 (HOLOTYPE: MO).

Quoad habitum deminutum petiolos brevistipitatos et laminas chartaceas, *C. humilem* valde cognatum, sed ab ea basibus laminaribus obtusis vel rotundatis (non acutis) inflorescentis paniculatis cum ramulis floriferis corymbosis (nec tripinnati-paniculatis cum ramulis floriferis spicatis vel racemosis) petalis ad apicem cucullatis (nec planis) ad marginem glandulari-papillosis (nec glabris) filamentis glabris (nec glandulari-granulosis) antherarum connectivis manifeste punctatis (nec epunctatis) prompte cognoscitur.

*Subshrub* to ca. 15 cm tall. *Stem* terete, ca. 4 mm diam., bearing rufous hydropotes and sparingly glandular-papillate. *Leaves* alternate; blades chartaceous, ovate to elliptic, 5.7–14 cm long, 4.0–7.5 cm wide, apically acute, the tip mucronulate, basally obtuse to rounded slightly decurrent on the petiole, bearing rufous hydropotes above and below, midrib slightly impressed distally, slightly raised proximally above, prominent below, the secondary veins 4–9 pairs, barely visible above, prominent below, without collecting vein, the margin scarious, subentire or entire; petiole deeply canaliculate, decurrent on stem, at times appearing to form a small sheath, (1.5–)2.0–4.5 cm long, 0.2–0.3 cm diam., increasing in length acropetally along stem. *Cataphylls* membranaceous, alternate, subulate, 6–12 mm long, 0.6–1.2 mm wide, located just below center of internode, psuedoverticillate, apically acicular, keeled, conspicuously black punctate-lineate, bearing hydropotes and glandular papillae. *Inflorescence bract* subulate, 3.9–4.0 mm long, 2.0–3.0 mm wide. *Staminate inflorescence*: supraaxillary, paniculate, 1.2–3.5 cm long, appearing succulent, the branches racemose, the rachis densely glandular-papillate; peduncle 0.5–1.0 cm long; inflorescence branch bracts linear-lanceolate, 1.8–2.2 mm long, 0.4–0.6 mm wide, conspicuously punctate, glandular-papillate; floral bracts subtending and equal to the pedicels, 1.0–2.5 mm long. *Staminate flowers* homomerous, 4-merous, green; calyx cotyliform, membranaceous, 1.2–1.5 mm long, more or less equally divided, hyaline, the tube 0.2–0.3

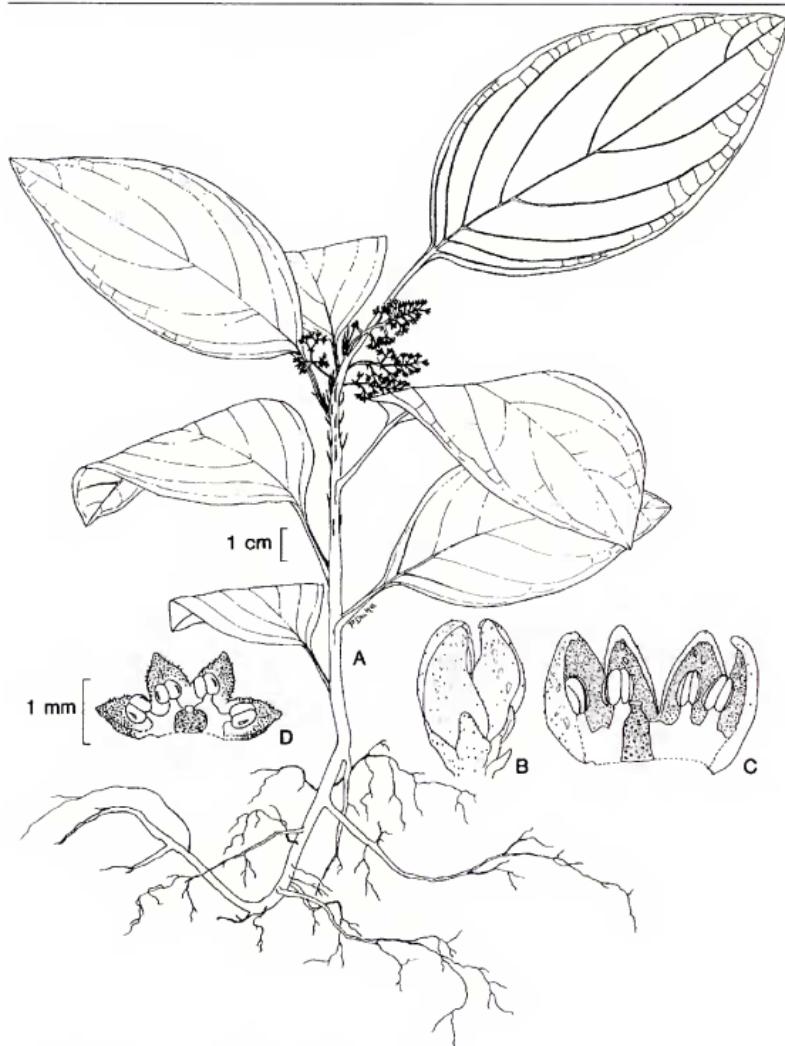


FIG. 16. *Cybianthus croatii* Pipoly. A. Habit, showing stem with small, acicular cataphylls, acropetally longer petioles, and supraaxillary inflorescences. B. Staminate flower bud, showing sparsely glandular-papillate, cotyloidiform calyx. C. Open staminate corolla, showing cucullate lobe apices, suborbicular anthers and conic pistillode. D. Open pistillate corolla, showing oblate antherodes, subglobose pistil. A-C, drawn from holotype. D, drawn from L. Albert de Escobar 3744. Figure drawn by Peggy Duke.

mm long, the lobes deltate, 1.0–1.2 mm long and wide, apically acute to somewhat acuminate, prominently black punctate, sparsely glandular-papillate without, the margin irregular, entire, glandular-papillate at first, glabrescent; corolla subrotate, carnose, 2.4–2.7 mm long, the tube 0.7–0.8 mm long, translucent, the lobes opaque, oblong, 1.7–2.1 mm long, 0.9–1.0 mm wide, apically rounded to obtuse, cucullate, sparingly glandular-papillate without, densely glandular-granulose within, prominently black punctate without, especially at apex, the margin entire, glandular-granulose; stamens 2.5–2.6 mm long, the tube conspicuous, carnose, 0.7–0.8 mm long, subtruncate, the apically free portions of the filaments terete, 0.9–1.0 mm long, epunctate, glabrous, erect except slightly recurved ventrally at point of attachment to anther, the anthers suborbicular, 0.7–0.8 mm long and wide, apically rounded, deeply cordate basally, the connective epunctate ventrally, prominently black punctate dorsally; pistillode conic, 1.3 mm long, 0.7 mm wide, densely translucent-lepidote, conspicuously black punctate, hollow. *Pistillate inflorescence:* as staminate, but 2.5–3.5 cm long; pedicels 0.6–1.1 mm long. *Pistillate flowers* as in staminate but calyx 1.3–1.5 mm long, equally divided, the tube 0.2–0.3 mm long, the lobes triangular, 0.9–1.2 mm long, 0.5–0.7 mm wide, apically acuminate, sparsely glandular-papillate along margin without; corolla subcampanulate, the lobes 1.3–1.5 mm long, the tube to 0.2 mm long, the lobes suborbicular, 1.1–1.3 mm long, 1.0–1.1 mm wide, apically rounded to obtuse, minutely glandular-granulose along margin without and throughout; staminodes as in stamens but 0.9–1.0 mm long, the tube, ca. 0.2 mm long, the apically free portions of the filaments 0.2–0.3 mm long, the antherodes oblate, 0.4–0.5 mm long, 0.5–0.6 mm wide, apically truncate, basally obtuse, the connective prominently black punctate ventrally; pistil subglobose, 0.6–0.7 mm long and diam., densely translucent-lepidote, conspicuously black punctate, the placenta deeply cupuliform, bearing 2 ovules, the style barely discernible, to 0.1 mm long, stigma subcapitate, the margin lacinate, early caducous. *Fruit unknown.*

*Distribution.*—Known only from the type (Ecuador) and from Antioquia, Colombia, at 970–2,440 m elevation..

*Ecology and conservation status.*—*Cybianthus croatii* occurs in premontane and montane wet forest, where it is locally common in protected areas near forest margins. Because of its restricted habitat, it is presumed to be threatened.

*Etymology.*—It is with great pleasure that I dedicate this species to Thomas B. Croat, pre-eminent authority on the systematics of Neotropical Araceae, indefatigable collector, gentleman, scholar, and the P. A. Schulze Curator of Botany at the Missouri Botanical Garden. During the tropical botany course I took from him in Costa Rica in 1977, I was first shown and became intrigued with the systematics and population biology of the Myrsinaceae.

PARATYPE: COLOMBIA. Antioquia: Mpio. Caldas, above town, Finca La Zarza, 2,440 m, 2 Feb 1984 (pist. fl), L. Albert de Escobar et al. 3744 (HUA, US).

*Cybianthus croatii* is the smallest myrsinaceous shrub that exhibits Corner's Model (Hallé et al. 1978). It is interesting to note that with each successive pseudowhorl of cataphylls, an inflorescence is produced, followed by a larger leaf with a longer petiole. This species appears to be most closely related to another diminutive plant, *C. humilis*, known only from the Department of Antioquia, Colombia and adjacent Chocó, and from Ecuador. The synapomorphy which defines the *Cybianthus humilis-C. croatii* clade is the scarious leaf margin, known elsewhere only in subgenus *Grammadenia* (Pipoly 1987, unpubl. data). However, because that subgenus occurs on the other side of the generic cladogram presented by Pipoly (1987), it is most parsimonious to hypothesize that the margin has arisen independently in these distant lineages. The pistillode is present in both of these species, and I have chosen to postulate that this represents a reversal because it is the most parsimonious conclusion. *Cybianthus croatii* is defined by the autapomorphic rufous stem hydropotes and the acropetally longer petioles. Despite the fact that the distribution of this species entirely overlaps that of *C. humilis*, it appears that *C. croatii* is restricted to montane and cloud forests, where *C. humilis* is restricted to premontane pluvial forests and subpáramo thickets. This is yet another example of sister species in altitudinally adjacent habitats, already reported in *Cybianthus* subgenus *Laxiflorus* (Pipoly 1983) C. subgenus *Microeconomorpha* (Pipoly 1983b) and C. subgenus *Conomorpha* (Pipoly 1992a). Whether this supports the concept of speciation by peripheral isolation (parapatric) is unknown. Further studies of the respective population biologies of the subgenus are needed.

17. *Cybianthus humilis* (Mez) G. Agostini (Fig. 3F), Acta Biol. Venez. 10:163. 1980. *Weigeltia humilis* Mez in Engl., Pflanzenr. IV. 236(Heft 9):291. 1902.

TYPE: ECUADOR. Without locality, 1896 (stam. fl), A. Sodiro 100/14 (HOLOTYPE: B-destr., F Neg. 4856; LECTOTYPE, here designated: COLOMBIA. ANTIOQUIA: 2,650–2,800 m, 1 Apr 1880 (stam. fl), W. Kalbreyer 1534 (K). Although Mez (1902) did not specifically mention the Sodiro collection as the type, he cited the Sodiro and the Kalbreyer specimens in the protologue. However, the F photograph clearly shows that a drawing of a dissection accompanies the Sodiro specimen, while that of Kalbreyer does not, suggesting that the Sodiro specimen formed the principal element upon which the description was based. Unfortunately, no duplicates of that Sodiro collection have been located. Mez also annotated the Kalbreyer sheet at K, and thus I designate it as the lectotype.

*Comonyrsine sodiroana* Mez, Bull. Herb. Boissier, 2 ser 5:535. 1905. syn. nov. *Cybianthus sodiroanus* (Mez) G. Agostini, Acta Biol. Venez. 10:163. 1980. TYPE: ECUADOR. ATACATZO, Jan 1902 (stam. fl), A. Sodiro 100/2 (HOLOTYPE: B-destr.; LECTOTYPE, here designated: P).

*Subshrub* to 25 cm tall. *Stem* terete, 3.5–4.0 mm diam., densely glandular-papillate, early glabrescent. *Cataphylls* in alternating nodes with leaves, membranaceous, subulate, 10–13 mm long, 1.7–2.6 mm wide, apically long-

attenuate, keeled, midrib prominent below, prominently black punctate and lineate-punctate, glandular-papillate, glabrescent, the margin opaque, flat, entire. *Leaves* subopposite; blades chartaceous, elliptic to narrowly elliptic, 15–20(–27) mm long, (4.0–)7.0–8.5 cm wide, apically acute to subacuminate, terminating in an inconspicuous mucro, basally acute, bearing hydropoten above and below, inconspicuously pellucid punctate, midrib somewhat impressed above, prominent below, the secondary veins 6–11 pairs, slightly impressed above or not, prominently raised below, not united by a submarginal collecting vein, the margin entire, opaque, subrevolute; petioles canaliculate, thin, 1.0–2.0 cm long, 2.0–2.5 mm diam., glabrous, not decurrent on the stem. *Inflorescence bracts* similar to cataphylls, but 1.2–1.3 mm long, 1.5–2.2 mm wide. *Staminate inflorescence*: a bipinnate panicle, 3.5–15(–19) cm long, the rachis densely glandular-papillate, the branches spicate or rarely racemose, appearing subglomerulate apically; inflorescence branch bracts membranaceous, subulate, 3–4.5 mm long, 0.3–0.5 mm wide, densely and prominently black punctate-lineate, sparingly papillate; pedicels essentially obsolete, to 0.3(–2) mm long; floral bract membranaceous, ovate, asymmetric, 2.3–2.8 mm long, 0.9–1.2 mm wide, apically abruptly acuminate, medially keeled, epunctate, the margin erose, stipitate glandular-papillate. *Staminate flowers* 4–5-merous; calyx membranaceous, cotyloidiform, 1.5–2.0 mm long, tube 0.2–0.3 mm long, the lobes ovate to lanceolate, 1.3–1.7 mm long, 0.5–1.3 mm wide, unequally divided, apically acuminate to acute and often erose or premorse, glandular papillose-puberulent without, the margin erose, glabrous; corolla chartaceous, appearing subrotate, 3.7–4.5 mm long, the tube 1.1–1.5 mm long, the lobes linear-lanceolate to oblong, 2.4–3.2 mm long, 1.0–1.5 mm wide, often unequal, apically long-attenuate to obtuse, moderately rufous glandular-granulose throughout within, sparsely glandular-papillate without, hyaline, the margin entire, glabrous; stamens 3.0–3.9 mm long, the tube 1.1–1.5 mm long, coriaceous, conspicuous, sparsely glandular-granulose, elobate, the apically free portions of the filaments basally as wide or wider than anther, then tapering apically, 1.9–2.4 mm long, terete, glandular-granulose, the anthers oblate, 0.4–0.5 mm long, 0.6–0.7 mm wide, apically truncate, basally subcordate, the connective epunctate; pistillode glabrous lageniform, 1.4–1.6 mm long, 0.8–1.0 mm wide, the stigma punctiform. *Pistillate inflorescence*: as in the staminate but 7–10 cm long, 4–6 cm wide; inflorescence branch bracts 2.5–3.5 mm long, 0.2–0.3 mm wide; peduncle 1–2.5 cm long; floral bracts 1–1.5 mm long; pedicels obsolete. *Pistillate flowers* unknown; fruiting calyx as in staminate but 1.3–1.5 mm long, the tube ca. 0.2–0.3 mm long, the lobes 1.1–1.2 mm long, 0.2–0.3 mm wide. *Fruit* globose, reddish-purple when fresh, 4–6 mm long and diam. when dried, the exocarp thin, conspicuously pellucid punctate.

*Distribution.*—Known only from Colombia and Ecuador, at 1,450–2,700 m elevation.

*Ecology and conservation status.*—*Cybianthus humilis* grows in deep shade among rocks at the margins of premontane pluvial forests. Populations I observed in Colombia grew only in undisturbed areas with deep shade, leaf litter and organic humus. Because of the apparently restricted habitat, this species should be considered threatened.

*Etymology.*—The specific epithet refers to the low habit of the plant.

*Local names and uses.*—Colombia (Chocó): "Hierba del palo grande." Ground to make crude syrups; syrup applied externally to cure cuts, taken internally to cure internal infections, clean the stomach and against chills. Given that it is a shade species, the common name probably refers to its frequency in shaded areas near large trees.

Specimens examined. COLOMBIA. Antioquia: Mpio. Urrao, Parque Nacional Las Orquídeas, Vereda Calles, permanent inventory for premontane pluvial forest, right bank of Río Calles, 06° 32' N, 76° 19' W, 1,450 m, 27 Nov 1993 (fr), J. Pipoly et al. 17186 (COL, JAUM, MO), 1,450–1,500 m, 29 Nov 1993 (fr), J. Pipoly et al. 17361 (COL, JAUM, MO); without locality and date, (stam. fl), F. Lehmann s.n. (F, K). Chocó: Mpio. de Quibdó, Corregimiento San Francisco Ichó, Quebrada Caledonia along Caledonia Rd., 9 Apr 1987 (ster.), F. García & J. Echavarría 259-A (COL, CHOCO, MO). Nariño: Mpio. Barbacoas, Corregimiento Orríz y Zamora, Vereda El Barro, Reserva Natural Río Ñambí, ca. 5 km W de Altaquer, faldas occidentales de la Cordillera Occidental, 01° 18' N, 78° 08' W, 1,350–1,400 m, 3 Sep 1997 (ster.), J. Pipoly, A. Cogollo, et al. 21240 (BRIT, FMB, JAUM, PSO). Quindío: Mpio. De Salento, Estación Navarco, Alto San Ignacio, 2,850 m, 23 Nov 1990 (stam. fl), P. Franco et al. 3204 (COL, MO). Risaralda: Mpio. Sta. Rosa, Camino de Herradura entre Terciales y Páramo Sta. Rosa, Cordillera Central, vertiente Occidental, Hacienda El Margarital, 2,500 m, 18 Aug 1980 (fr), J. Idrobo et al. 9671 (COL, MO). ECUADOR. Napo: Cantón El Chaco, Proyecto Hidroeléctrico Coca, Punto ST3, right bank of Río Quijos, ca. 10 km S of Reventador, 1,500 m, 3–5 Oct 1990 (fr), W. Palacios 5950 (MO, QCNE). Pichincha: Cantón Quito; Parroquia Calacalí, Reserva Geobotánica Pululahua, 00° 01' N, 78° 35' W, 1,800–2,000 m, 29 Jul 1989 (stam. fl), C. Cerón 7184 (MO, QCNA); Mindo, 26 Jun 1876 (stam. fl), E. André 3819 (K).

*Cybianthus humilis* is most closely related to *C. croatii*, by virtue of its synapomorphic scarious leaf margin. The autapomorphies that distinguish *C. humilis* from all other species of the subgenus include the premorse apices of the calyx lobes, the unequal corolla division, and the oblate anther shape.

#### 18. *Cybianthus sprucei* (Hook. f.) G. Agostini, Acta Biol. Venez. 10(2):164.

1980. *Comomysine sprucei* Hook. f. in Benth. et Hook., Gen. Pl. 2:644. 1876. *Weigeltia sprucei* (Hook. f.) Mez in Engl., Pflanzenw. IV. 236(Heft 9):291. 1902. TYPE: ECUADOR. [CHIMBORAZO: W slopes of Volcan Chimborazo, 17 Jun 1860] (stam. fl), R. Spruce 6144 (HOLOTYPE, K-2 sheets). Note: label on specimen does not indicate place or date. Information was derived by comments regarding habit, etc. on the label which matched data given in Spruce (1880).

*Weigeltia panamensis* Standl., Publ. Field Mus. Nat. Hist. Bot. Ser. 22:164. 1940. syn. nov. *Cybianthus panamensis* (Standl.) G. Agostini, Acta Biol. Venez. 10:163. 1980. TYPE:

PANAMA. DARIÉN: Cana, Cuasi Trail, Dtto. Cheijana, 1000 m, 10 Mar 1940 (stam. fl), M. E. Terry & R. A. Terry 1490 (HOLOTYPE: F-2 sheets; ISOTYPES: A, MO).

Weigeltia purpurea Cuarrec., Revista Acad. Colomb. Ci. Exact. 8(31):326. 1951. TYPE: COLOMBIA. VALLE DEL CAUCA: Bahía de Buenaventura, Quebrada de San Joaquín, 0–10 m, 21 Feb 1946 (stam. fl), J. Cuatrecasas 19892 (HOLOTYPE: F; ISOTYPE: COL).

Shrub to tree to 5 m, flowering from less than 1 m. Stem terete, 1.3–2.5 cm diam. below uppermost leaves, swollen at nodes, semi-woody, glandular-papillate-puberulent, glabrescent. *Cataphylls* few, alternate, coriaceous, subulate, (2.5–)3.0–5.0 cm long, 2–4 mm wide, strongly keeled, densely glandular-papillose-puberulent, glabrescent, conspicuously black punctate, the margin opaque, regular, entire. Leaves pseudoverticillate; blades chartaceous, widely oblong to elliptic, rarely widely obovate, (26–)31–75 cm long, (6.5–)10–30 cm wide, apically rounded, obtuse or rarely acutish, not mucronulate, basally abruptly subcuneate, asymmetric, slightly decurrent on petiole, bearing a few hydropotens above, moderately rufous glandular-papillate and with a moderate number of hydropotens below, prominently red or black puctate, the margin regular, opaque, entire; petioles stiff, (2.5–)5.0–14(–23) cm long, 0.3–0.9 cm diam., slightly to moderately canaliculate, swollen basally, sparingly glandular-papillate, glabrescent. *Staminate Inflorescence*: a pyramidal bipinnate thyrsoid panicle, 9–16.5(–19) cm long, 9–17(–22) cm wide, the branches subspicule, the rachis densely glandular-papillose-puberulent; peduncle 0.5–2.0 cm long; inflorescence branch bracts chartaceous, linear-lanceolate, 8.5–12.9 mm long, 0.6–0.9 mm wide, apically narrowly acute, conspicuously black punctate, densely glandular-papillate, glabrescent, flat, the margin opaque, regular, entire; floral bracts membranous, linear, 1.5–2.0(–2.5) mm long, 0.5–0.6 mm wide, subulate, hyaline, densely glandular-papillose puberulent, the margin entire, glandular-papillate; pedicels obsolete to 0.2 mm long. *Staminate flowers* homomerous, 4-merous, coriaceous, subsessile, racemose, 4–5-merous, white in bud, green in anthesis, then crimson; calyx coriaceous, subcotyliform, unequally divided, 0.9–1.1 mm long, the tube 0.1–0.2 mm long, the lobes linear-lanceolate, 0.7–0.9 mm long, 0.2–0.5 mm wide, apically subulate, keeled, brown punctate-lineate or punctate medially, sparsely glandular-papillate, the margin irregular, subentire to erose, densely glandular-ciliate; corolla subrotate, 2.0–2.9 mm long, the tube 0.2–0.3 mm long, the lobes narrowly ovate to lanceolate, (1.7–)1.9–2.3(–2.6) mm long, 0.9–1.0(–1.5) mm wide, reflexed 135° from tube at anthesis, apically attenuate, densely glandular-granulose throughout within and along margin within and without, inconspicuously pellucid punctate, the margin entire, somewhat irregular, densely glandular-granulose; stamens exserted to slightly shorter than the corolla lobe, 1.6–2.2 mm long, the tube ca. 0.5 mm long, conspicuous, coriaceous, taller than the corolla tube, elobate, opaque, epunctate, glabrous, the apically free portions of the filaments terete, thicker than the

anthers, 0.8–1.6 mm long, ventrally recurved at anthesis, epunctate, glabrous, the anthers subglobose, ca. 0.3 mm long, 0.4–0.5 mm wide, apically rounded, basally cordulate, dorsifixed near base so as to appear basifixated, the connective prominently red or black punctate dorsally; pistillode normally absent, occasionally conic, to 1 mm long, 0.3 mm wide, densely translucent-lepidote. *Pistillate inflorescence* resembling staminate in all features, but smaller, 2.5–3.5(–13) cm long, 3.5–8.0(–12.5) cm wide; peduncle 0.5–1.5 cm long; inflorescence branch bracts 3.0–3.5(–5.0) mm long, to 0.6 mm wide, at times somewhat cucullate; floral bracts 2.0–2.6 mm long, ca. 0.5 mm wide, pedicels virtually obsolete, or cylindrical to 0.1 mm long in flower, accrescent and incrassate to 2.0 mm long, 1.0–1.5 mm diam. in fruit. *Pistillate flowers* as in staminate, forming a condensed spike on the inflorescence branches; calyx subcupuliform, 1.2–1.4 mm long; the tube to 0.1–0.2 mm long, the lobes 0.9–1.1 mm long, 0.9–1.0 mm wide, widely ovate, apically acute; corolla rotate, 2.7–2.9 mm long, the tube 0.6–0.7 mm long, the lobes oblong to elliptic, 2.0–2.2 mm long, 0.9–1.0 mm wide, apically acute; staminodes 1.5–1.6 mm long, the tube 1.0–1.1 mm long, the apically free portions of the filaments 0.4–0.5 mm long, the antherodes malformed, 0.2–0.3 mm long, 0.3–0.4 mm wide; pistil obturbinate, 1.5–1.6 mm long, densely translucent-lepidote and prominently pellucid punctate, the style obsolete, the stigma capitate, 0.2–0.3 mm long, subsessile, 4–many-lobed, the lobes 1.3–2.3 mm long, viscid, bright crimson, the placenta ovoid, the ovules 2, born on side of placenta. *Fruit* subglobose, 5.0–9.0 mm long, 9–14 mm diam., fleshy, the exocarp thick, orange at maturity, prominently black punctate. *Bisexual Inflorescence* resembling staminate in all features except: 3.7–14.5 cm long, 2.5–12.5 cm wide; inflorescence branch bracts and floral bracts and pedicels as in pistillate. *Bisexual flowers* spicate, less crowded than in the pistillate, more crowded than staminate; calyx coryliform, (4–)5-parted, 1.0–1.2 mm long, the tube ca. 0.2 mm long, the lobes narrowly ovate to narrowly triangular, 0.8–1.0 mm long, 0.3–0.4 mm wide, apically acute to narrowly acute; corolla 4-lobed, rotate, 2.0–2.7 mm long, the tube ca. 0.3 mm long, the lobes oblong, 1.7–2.4 mm long, 0.9–1.2 mm wide, apically acute; stamens 1.2–1.5 mm long, the tube ca. 0.5 mm long, the apically free portions of the filaments 0.6–0.7 mm long, the anthers oblate, 0.3–0.4 mm long, ca. 0.5 mm wide; pistil as in pistillate flowers except 1.2–1.4 mm long, the ovary 1.0–1.1 mm long, 0.7–0.9 mm diam., the style short, 0.1–0.2 mm long, the stigma capitate, to 0.2 mm long, the lobes 0.9–1.1 mm long, the placenta ellipsoid, the ovules 2–3, borne on side of placenta. *Bisexual fruit* subglobose, as in pistillate, but 4–5 mm long, 5–7 mm diam.

*Distribution.*—From Darién, Panama to Loreto, Peru, from 0–1,700 m elevation.

*Ecology and conservation status.*—*Cybianthus sprucei* is a ridgetop species,

occurring in premontane wet and rainforests and also in lowland forests on forest margins of exposed hilltops. This species, as opposed to its closest congener, *Cybianthus simplex*, occurs in areas of high incident light for at least part of the day. Because *Cybianthus sprucei* continues to reproduce in spite of mild forest intervention, it is not considered threatened or endangered.

**Etymology.**—This species was named in honor of Richard Spruce, ardent collector and student of the Andean and Amazonian flora.

**Local names and uses.**—Colombia: "margoandre," "Tunda" Spanish (Valle del Cauca, Colombia); Ecuador: "urcu tahucu" (Quichua); ground and a vapor bath is taken to "send evil away" and to treat body pains, headaches, internal colds; Peru: "kurúp" (Jívaro); the root is mashed and boiled, and the decoction is drunk to "strengthen" the body.

Specimens examined. PANAMA. Darién: Cerro Pirré, 10–20 Jul 1977 (bisex. fl, fr), J. Folsom 4544 (MO, PMA); on ridge of Cerro Pirré, 08° 00' N, 77° 45' W, 1,000–1,080 m, 14 Sep 1989 (fr), G. McPherson 14066 (BRIT, MO). COLOMBIA. Cauca: Río Micay, en Guayabal, 5–20 m, 25 Feb 1943 (pist. fr), J. Cuatrecasas 14138 (COL, F, US); Distrito Cauca, El Tambo, 900 m, Apr 1937 (stam. fl), K. von Sneidern 1615 (S). Chocó: Along Rd. between Quibdó and Medellín, Km 207.5, 0–200 m, 18 Dec 1980 (pist. fl, fr), T. Croat & A. Cogollo 52257 (COL, JAUM, MO); Alto del Buey, 1,200–1,800 m, 8 Jan 1973 (pist. fl, fr), A. Gentry & E. Forero 7317 (COL, F, MO). Nariño: La Guayacana, Funes, 24 Jun 1951 (stam. fl), R. Castañeda 2873 (COL, F); Ricaurte, 1,300 m; 18 Apr 1941 (bisex. fl), K. von Sneidern A612 bis (S); Reserva Natural La Planada, 7 km above Chucunéns on Rd. between Tuquerres and Ricaurte, along Sendero La Vieja, 01° 06' N, 77° 54' W, 1,780–1850 m, 7 Mar 1990 (fr), T. Croat 71155 (MO, PSO). Valle del Cauca: Pacific coast, Río Naya, Puerto Merizalde, 5–20 m, 22 Feb 1943 (bisex. fl), J. Cuatrecasas 14053 (COL, F); Río Yurumanguf, 550 m, 28 Jan–10 Feb 1944 (pist. fl, fr), J. Cuatrecasas 15743 (COL, F, US); Río Calima, Chocó region, La Trojita, 5–50 m, 20 Feb 1944 (stam., pist. fl-sheets mixed), J. Cuatrecasas 16272 (COL, F, US); Río Cajambre, Barco, 5–80 m, 30 Apr 1944 (fr), J. Cuatrecasas 17625 (COL, F, US); Bajo Calima, 15 km N of Buenaventura, Cartón de Colombia concession, Juanchachio region, 03° 56' N, 77° 08' W, 500 m, 27 Mar 1986 (stam. fl), A. Gentry et al. 53713 (COL, MO), Concesión Pulpapel/Buenaventura, 03° 55' N, 77° 00' W, 100 m, 7 Mar 1985 (fr), M. Monsalve 767 (COL, CUVC, MO), 19 Mar 1985 (stam. fl), M. Monsalve 790 (CUVC, MO), 21 Mar 1985 (stam. fl), M. Monsalve 797 (CUVC, MO), 12 Mar 1986 (stam. bud), M. Monsalve 981 (CUVC, MO), 24 Aug 1986 (fr), M. Monsalve 1124 (CUVC, MO); Bahía de Malaga, near mouth of Quebrada La Sierpe, 0 4° 00' N, 77° 15' W, 0–20 m, 17 Feb 1983 (stam. fl), A. Gentry et al. 40453 (COL, MO); 18 km E of Buenaventura, 50 m, 14 Feb 1939 (fr), E. Killip & H. Garfia 33279 (BM, COL, NY, US), Buenaventura, Jun 1901 (pist. fl, fr), F. Lehmann B. T. 651 (K, NY). Putumayo: Umbria, 00° 54' N, 76° 10' W, 325 m, Jan–Feb 1931 (stam. fl), G. Klug 2108 (US). ECUADOR. Bolívar: Along first 15 km of Chillanes-El Tambo, 2,400 m, 18 Jul 1991 (stam. fl), H. van der Werff et al. 12430 (BRIT, MO, QCNE); along Rd. Chillanes-San Pablo, 6 km outside Chillanes, 2,600 m, 21 Jul 1991 (fr), H. van der Werff et al. 12561 (MO, QCNE). Morona-Santiago: 15 km N of Macas, Rd to Rio Upano, 02° 07' S, 78° 08' W, 1,250 m, 20 Feb 1987 (bisex. fl), J. Bobbin et al. 1493 (GB); Cordillera de Cutucu, W slopes along trail from Logrono to Yaupi, 02° 46' S, 78° 06' W, 1,200 m, 10 Nov 1976 (stam. fl), M. Maddison et al. 3204 (US). Napo: Cantón Archidona, Carretera Hollín-Loreto, Río Huataraco, 2 hrs walk from Guagua Sumaco,

00° 43' S, 77° 32' W, 800–1,000 m, 23–30 Aug 1989 (stam. fl), *C. Cerón & M. Factor* 7648 (MO, QCNE); Cantón Orellana, Reserva Florística El Chuncho, 5 km N of Coca, 00° 25' S, 77° 01' W, 250 m, 23 May 1993 (fr), *W. Palacios* 10680 (MO, QCNE), El Chuncho, el Payamino, Estación Experimental INIAP-Napo, 5 km NW of Coca, 00° 30' S, 77° 01' W, 250 m, 12 Oct 1987 (stam. fl), *C. Cerón* 2494 (MO, QCNE); Cantón Tena, Mishualli, junction of Ríos Mishualli and Napo, 01° 03' S, 77° 41' W, 500 m, 13–14 Aug 1979 (fr), *L. Holm-Nielsen* 19295 (AAU); Estación Biológica Jacun Sacha, along S bank of Río Napo, 1 km E of Puerto Misahualli, 00° 04' S, 77° 36' W, 450 m, 1 Apr 1992 (fr), *T. Croat* 73352 (MO, QCNE), 8 km E of Puerto Mishualli, 01° 04' S, 77° 36' W, 400 m, 14 Aug 1989 (ster.), *C. Cerón* 7409 (MO, QCNE), 22 Sep 1989 (stam. fl), *W. Palacios* 4471 (MO, QCNE), 16 Mar 1991 (fr), *D. Neill* 9813 (BRIT, F, MO, QCNE); Río Blanco Comunidad, headwaters of Río Huambuno, 6 km NNW of Ahuano, 01° 44' S, 77° 44' W, 440 m, 18 Jul–9 Aug 1990 (fr), *E. Kohn* 1311 (MO). PERU. AMAZONAS: Prov. Bagua, Yamayakat, trail to Putuim, 04° 55' S, 78° 19' W, 500 m, 17 Oct 1996 (stam. fl), *R. Vásquez & N. Jaramillo* 20318 (AMAZ, BRIT, MO). LORETO: Prov. Loreto, Pampa Hermosa and vicinity, Río Corrientes, 1 km S of junction with Río Macusari, 03° 15' S, 75° 50' W, 160 m, 3–20 Dec 1985 (stam. fl), *W. Lewis et al.* 10180 (BRIT, MO, USM).

*Cybianthus sprucei* was misinterpreted by Mez, and confused with *C. simplex* (Mez 1902). From there, *Weigelia panamensis* was described based primarily on subtle differences and geography. Finally, Cuatrecasas described *Weigelia purpurea* from the Chocó floristic region of Colombia, notable only for its narrower leaves, the secondary veins more arcuate, and some quantitative floral characteristics.

*Cybianthus sprucei* is most closely related to *C. simplex* because of the homomerous flowers, long petioles and non-mucronulate leaf apices. However, *Cybianthus sprucei* may easily be separated from *C. simplex* because of its arborescent habit, pyramidal panicle with spicate branches, symmetric leaf base and longer cataphylls.

19. *Cybianthus simplex* (Hook. f.) G. Agostini (Fig. 4C), Acta Biol. Venez. 10:163. 1980. *Comomysine simplex* Hook. f. in Benth. & Hook., Gen. Pl. 2:644. 1876. *Weigelia simplex* (Hook. f.) Mez in Engl., Pflanzren IV. 236(Heft 9): 290. 1902. TYPE: ECUADOR. CHIMBORAZO: At foot of Volcán Chimborazo, 760 m, Aug 1860 (pist. fl, fr), *R. Spruce* 6143 (HOLOTYPE: K-2 sheets).

*Weigelia chamaeaphyla* Diels, Notizbl. Bot. Gart. Berlin-Dahlem 15:383. 1941, syn. nov. *Cybianthus chamaeaphyla* (Diels) G. Agostini, Acta Biol. Venez. 10:163. 1980. TYPE: ECUADOR. PASTAZA: Mera, 1,200 m, 15 Nov 1938 (stam. fl), *H. Schultze-Rhonhof* 2983 (HOLOTYPE: B-destr.; no isotype found). I defer neotypification until material has been regathered from the type locality or an adjacent one.

*Semi-woody subshrub* to 1(–3.5) m tall. *Stem* terete, 1–5 cm diam., sparsely glandular-papillate, glabrescent. *Cataphylls* few, spirally arranged in internodal areas, coriaceous, subulate, 6.5–26.5 mm long, 1.12–1.7 mm wide, keeled, densely and prominently black punctate and punctate-lineate, sparsely glandular-papillate, the margin flat, entire. *Leaves* pseudoverticillate; blades membranaceous, elliptic to oblong, (34.5–)38–46.5(–80) cm long, (12.5–)

13.5–18.5(–32.5) cm wide, apically broadly acute or rounded to a short acumen, rarely acute, basally asymmetric, broadly rounded or rarely abruptly acute, slightly decurrent on the petiole, hydropotes few above, numerous below, often sparsely glandular-papillate below, conspicuously black punctate, the margin irregular, hyaline when juvenile, opaque at maturity, flat, entire; petioles rigid, deeply canaliculate, 7–17(–21) cm long, 4–6 mm diam., slightly marginate at junctions of the blade, expanded basally and slightly decurrent on stem, sparsely glandular-papillate, glabrescent. *Inflorescence bracts* membranaceous, linear-lanceolate, 17–25 mm long, 2–4 mm wide, apically long-attenuate, hyaline, densely and prominently black punctate-lineare, the margin irregular, entire; peduncle (1.2–)2.4–4.5 cm long. *Staminate inflorescence*: a thyrsoid panicle (columnar) 11–28(–54) cm long, bi- or tripinnate, the primary branches subopposite, each branch pyramidal-paniculate, the flowers racemose; inflorescence branch bracts linear-lanceolate, subulate, (50–)61–72 mm long, 0.5–1.3 mm wide, apically long-attenuate, medially keeled, hyaline, glandular-papillose throughout, the margin entire; floral bracts early caducous; pedicels 2.3–3(–5) mm long, glandular-papillate and -ciliolate. *Staminate flowers* 5-merous, green to greenish-white when fresh; calyx membranaceous, subcotyliform, 1.1–1.4 mm long, equally divided, the tube 0.2 mm long, the lobes lanceolate to lanceolate-subulate, apically narrowly acute to long-attenuate, hyaline, epunctate, the margin erose-dentate; corolla coriaceous, rotate, 2.2–3.1 mm long, the tube 0.3–0.7 mm long, the lobes linear-lanceolate, 1.5–2.6 mm long, 0.9–1.1 mm wide, reflexed distally 180° from the tube, the apically subulate, densely glandular-granulose throughout within and along the margin, epunctate, the margin regular, entire; stamens 1.0–2.3 mm long, the tube conspicuous, coriaceous, 0.3–0.7 mm long, the apically free portions of the filaments terete, as wide as the anthers, 1.0–1.1 mm long, ventrally recurved, the anthers connivent at first, subglobose, 0.4–0.5 mm long, 0.5–0.6 mm wide, apically rounded, basally cordulate, dorsifixed just above the base, the connective prominently black punctate dorsally; pistillode absent. *Pistillate inflorescence*: as in staminate but 16–30 cm long; inflorescence branch bracts ovate-subulate, 4.5–7 mm long, 1.5–2 mm wide, the margin irregular, erose; floral bracts membranaceous, linear-subulate, 1.6–2 mm long, 0.4–0.6 mm wide, apically long-attenuate, densely glandular-papillose puberulent, the margin irregular-entire; pedicel terete, 1–10 mm long, translucent, glandular-puberulent. *Pistillate flowers* green; calyx coriaceous, 0.6–1 mm long, unequally divided, the tube 0.2–0.3 mm long, the lobes ovate to widely ovate, 0.4–0.7 mm long and wide, apically acute, often moderately glandular-papillate without, the margin irregular, erose; corolla 1.5–1.7 mm long, the tube 0.4–0.5 mm long, the lobes oblong, 1.0–1.2 mm long, 0.7–0.8 mm wide, apically acute, reflexed 135°

from tube, glandular-papillate without; staminodes 0.8–1.2 mm long, the tube inconspicuous, membranaceous, 0.4–0.5 mm long, glabrous, elobate, the apically free portions of the filaments 0.3–0.4 mm long, the antherodes subglobose, 0.2 mm long, 0.3 mm wide, apically rounded, basally cordulate; pistil subglobose, 0.8–1.1 mm long, the ovary 0.6–0.8 mm long, 1.0–1.2 mm diam., densely translucent-lepidote, the style short, thick, 0.1 mm long, 0.7 mm diam., the stigma capitate, the margin lacinate, with numerous lobules to 0.2 mm long, the placenta umbonate, the ovules 3, exposed apically 1/3 their length on the placenta. *Fruit* subglobose, 4–5 mm long, 5–8 mm diam., red, exocarp somewhat thick, juicy, prominently black punctate.

*Distribution.*—Endemic to the slopes of the Western Cordillera of the Andes in Colombia and Ecuador, 60–2,200 m.

*Ecology and conservation status.*—*Cybianthus simplex* occurs in premontane wet and rainforests, occasionally in the understory of ridgetops forests. This species occurs in deep shade under the shrub stratum of the forest. It occurs more frequently in primary forest wet enough to maintain *Chusquea* populations, but can survive in disturbed forests as long as the shrub and *Chusquea* populations exist. Because of its habitat flexibility, it is not considered threatened or endangered.

*Etymology.*—The epithet “simplex” refers to the monoaxial habit of the species.

Specimens examined. COLOMBIA. Nariño: Mpio. Barbacoas, Corregimiento Ortíz y Zamora, Vereda El Barro, Reserva Natural Río Ñambí, ca. 5 km W de Altaquer, faldas occidentales de la Cordillera Occidental, 01° 18' N, 78° 08' W, 1,350–1,400 m, 1 Sep 1997 (stam. fl), J. Pipoly, A. Cogollo, et al. 21026, 21046, 21051, 21055 (BRIT, FMB, JAUM, PSO), 2 Sep 1997 (bisex. fl), J. Pipoly, A. Cogollo et al. 21109 (BRIT, JAUM, PSO), (ster.) J. Pipoly, A. Cogollo et al. 21131, 21148 (BRIT, PSO), (pist. fl, fr), J. Pipoly, A. Cogollo et al. 21173 (BRIT, FMB, JAUM, PSO), 1,490–1,500 m, 4 Sep 1997 (stam. fl), J. Pipoly, A. Cogollo et al. 21294 (BRIT, FMB, JAUM, PSO), (pist. fl), J. Pipoly, A. Cogollo et al. 21296 (BRIT, FMB, JAUM, PSO), 1,350–1,400 m, 5 Sep 1997 (stam. fl), J. Pipoly, A. Cogollo et al. 21326 (BRIT, JAUM, PSO), (ster.), J. Pipoly, A. Cogollo et al. 21328 (BRIT, JAUM, PSO), 1,350–1,145 m, 6 Sep 1997 (ster.), J. Pipoly, A. Cogollo et al. 21417 (BRIT, FMB, JAUM), 7 Sep 1997 (fr), J. Pipoly, A. Cogollo et al. 21469, 21471, 1,450–1,500 m, 8 Sep 1997 (stam. fl), J. Pipoly, A. Cogollo et al. 21520 (BRIT, FMB, JAUM, PSO), (ster.), J. Pipoly, A. Cogollo et al. 21524 (BRIT, JAUM, PSO); along trail from main Pasto-Tumaco Rd. to Río Ñambí, departing main Rd. at Escuela Mixta El Mirador, 7 km W of Altaquer, 01° 18' N, 78° 04' W, 1,100 m, 26 Feb 1992 (fr), T. Croat 72394 (JAUM, MO); Corregimiento Altaquer, Vereda el Barro, Reserva Natural Río Ñambí, W slope, W Cordillera, 01° 18' N, 78° 08' W, near Cabaña Fundación FELCA, 1,325 m, 11 Dec 1993 (fr), J. Betancur et al. 4857 (COL, MO); La Planada, Finca Salazar, 7 km above Ricaurte, 01° 08' N, 77° 58' W, 1,750 m, 29 Nov 1981 (pist. fl, fr), A. Gentry et al. 35188 (BRIT, COL, MO, US); La Planada, S of Ricaurte, 7 km from Tumaco-Pasto Rd., 01° 10' N, 77° 58' W, 1,800 m, 24 Jul 1986 (stam. fl), A. Gentry et al. 55053 (MO, PSO); trail to Hondón, 6–12 km SW of La Planada, 01° 04' N, 78° 02' W, 1,750–1,800 m, 5 Jan 1988 (fl bud), O. de Benavides & R. Keating 60411 (MO, PSO); Valley of Río Guiza, Rd. from El Espino to Tumaco, ca. 21 km W of

Ricaurte, 01° 15' N, 78° 07' W, 1,000 m, 7 Dec 1988 (stam. fl), *B. Hammel* 17150 (JAUM, MO). ECUADOR. Bolívar: Hacienda Changuil, LA 16; 02° 06' S, 79° 10' W, 500 m, 17 Aug 1995 (stam. fl), X. Cornejo & C. Bonifaz 4339 (GUAY, MO). Carchi: Prominent hillcrest directly N of Lita, on N side of Río Mira, E of Río Baboso, W-facing slope, 00° 53' N, 78° 27' W, 760 m, 7 Aug 1994 (ster.), *B. Boyle* 3473 (MO, QCNE); Steep N-facing slope S of Baboso, S side of Río Baboso, 00° 53' N, 78° 27' W, 750 m, 11 Aug 1994 (ster.), *B. Boyle* 3599 (MO, QCNE); Río Blanco drainage above Chical, tributary of Río San Juan, 12 km W of Maldonado, 1300–1500 m, 25 Sep 1979 (bisex. fl), A. Gentry & G. Shupp 26565 (MO, QCNE); Cantón Tulkán, Parroquia Tobar Donoso, Reserva Indígena Awá, Centro El Baboso, 00° 53' N, 78° 25' W, 1,800 m, 17–27 Aug 1992 (stam. fl), G. Tipaz et al. 1709 (BRIT, MO, QCNE), (stam. fl), G. Tipaz et al. 1886 (MO, QCNE), (fr), G. Tipaz et al. 1924 (MO, QCNE); 6 km above Maldonado, just below Puente de Palo, 00° 54' N, 78° 06' W, 2,275 m, 23 May 1993 (stam. fl), *B. Boyle* & J. Bradford 1878 (MO, QCNE); Trail from Pailon to Gualpi Chicó, Reserva Indígena Awá, 1.5 km past Río Blanco, 00° 51' N, 78° 16' W, 1,000–1,450 m, 14 Jan 1988 (stam. fl), W. Hoover et al. 2456 (MO, QCNE); SE Trail, Gualpi Chicó area of Awá Reserve, 00° 58' N, 78° 16' W, 1,330 m, 19 Jan 1988 (pist. fl, fr), W. Hoover et al. 2809 (MO, QCNE); Trail along ridge and forest slope to NW of Awá encampment, Gualpi Chicó area near Finca Rodríguez, 00° 58' N, 78° 16' W, 1,258–1,323 m, 19 Jan 1988 (fr), W. Hoover et al. 3358 (MO, QCNE). COTOPAXI: Río Guarapa, ca. 20 km NW of El Corazón, 250 m, 19 Jun 1967 (stam. fl), *B. Sparre* 17091 (S), 20 Jun 1967 (pist. fl), *B. Sparre* 17081 (S). El Oro: 11 km W of Las Piñas on new Rd. to Sta. Rosa, 850 m, 8 Oct 1979 (stam. fl), C. Dodson et al. 9101 (MO, SEL); Hacienda Buenaventura, 12 km W of Las Piñas on Rd. to Machala, 03° 48' S, 79° 46' W, 1,000 m, 1 Mar 1991 (stam. fl), M. Kessler 2601 (GOET, MO); New Rd. Saracay-Balzas-Velacruz, ca. 8 km SE of Saracay, 400 m, 30 Apr 1980 (stam. fl), G. Harling & L. Andersson 18778 (GB). GUAYAS: Cordillera Chogón-Colonche, Cerro Los Pontones; 01° 44' S, 08° 40' W, 500 m, 2 Jul 1994 (stam. fl), X. Cornejo & C. Bonifaz 2979 (GUAY, MO). Loja: Tierra Colorada, 1 km E of Landara, 8 km E of Mercadillo, 04° 02' S, 79° 57' W, 1,500 m, 9 Feb 1991 (pist. fl, fr), M. Kessler 2401 (BRIT, GOET). Manabí: Machalilla National Park, zona de San Sebastián, 01° 36' S, 80° 42' W, 600–700 m, 21 Jan 1991 (fr), A. Gentry et al. 72499 (MO, QCNE). PICHINCHA: Quito-San Juan Chiriboga-Sto. Domingo de los Colorados Rd., Branch km 59, 18 km NW of Rd., 1,700–2,000 m, 27 Sep 1986 (bud), V. Zak 1350 (MO, US); Quito-Aloag-Sto. Domingo de los Colorados, km 94, 10 km S of Rd., W slopes of Volcán El Corazón, 00° 21' 30" S, 78° 51' 15" W, 1,300–1,500 m, 25 Dec 1986 (fr), V. Zak 1545 (MO, US); 15 ha. Patch of forest in Cooperativa Sta. Marta No. 2, along Río Verde, 2 km SE of Sto. Domingo de Los Colorados, 530 m, 5 Feb 1979 (fr), C. Dodson et al. 7597 (MO, SEL); Reserva Florística-Ecológica "Río Guajalito," Km 59, Quito-Santo Domingo de los Colorados, 3.5 km NE of Rd., lower slopes of Volcán Pichincha, 00° 13' 53" S, 78° 48' 10" W, 1,800–2,200 m, 28 Dec 1985 (fr), J. Jaramillo 8298 (MO, QCA); Cantón Quito, Parroquia Nanegal, Reserva Maquipucuna, along Inca Trail to Río Tulambí, ca. 5 airline km SE of Nanegal, 00° 07' N, 78° 38' W, 1,350 m, 15 Sep 1989 (fr), G. Webster & P. Delprete 27594 (DAV, QCA), along trail between Río Umachaca and Río Tulambí, 00° 07.5' N, 78° 38.5' W, 1,200–1,300 m, 7 Jul 1990 (fr), G. Webster et al. 27795 (DAV, QCA); Montañas de Maquipucuna, Cerro Sosa, 00° 0.5' N, 78° 37' W, 1,950 m, 3 Jul 1991 (fr), G. Webster 28702 (DAV, QCA), 1,750 m, 3 Jul 1991 (stam. fl), G. Webster et al. 28710 (DAV, QCA), on ridge between Base Camps 1 & 2, 00° 5.5' N, 78° 37' W, 1,800–1,900 m, 6–7 Jul 1991 (fr), G. Webster & B. Castro 28769 (DAV, MO, QCA); along Río Umachaca near Hacienda El Carmen, 00° 07–7.5' N, 78° 38' W, 1,250 m, 6–7 Jul 1991 (fr), G. Webster et al. 28796 (DAV, QCA). QUININDE: Bilsa Biological Reserve, Montañas de Mache, 35 km W of Quinindé, 5 km W of Sta. Isabela, SE ridge trail, 00° 21' N, 79° 44' W, 400–600 m, 21

Sep 1994 (stam. fl), N. Pitman et al. 688 (MO, QCNE), 5 Dec 1994 (fr), N. Pitman 993 (MO, QCNE), Along Dogala and Invaders Trails, 00° 21' N, 79° 44' W, 400–600 m, 2 Jan 1995 (fr), N. Pitman 1161 (MO, QCNE). Province unknown: without locality, Sep 1896 (pist. fl), J. Sudiro 100/12 (B-destr., F Neg 4859).

This species has often been confused with *Cybianthus sprucei*, owing to variation in leaf morphology and inflorescence size. However, recent field studies conducted at the Río Ñambí Natural Reserve of Nariño, Colombia, have revealed that juvenile individuals have obtuse to somewhat broadly rounded, asymmetric leaf bases with long petioles, while mature individuals have tapering, asymmetric leaf bases. The confusion was due, in part, to precociously flowering individuals, detectable by their extremely small flowers, or to reiterative shoots, detectable by the renewal shoot visible below the "bayonet", that bears juvenile leaves and pink flowers. While the largest individuals of *Cybianthus simplex* may approach the size of many *C. sprucei*, the large pith of the stem in the former renders them extremely weak, and the stems may easily be snapped by hand, while the pith of *C. sprucei* is relatively smaller, and the stems can be bent without snapping in the field.

*Cybianthus simplex* is most closely related to *C. sprucei*, but may be separated from it by the columnar, thyrsoid panicles with racemose branches, the pedicellate flowers, asymmetric leaf base and shorter cataphylls. Populations corresponding to the type of *Weigelia chamaephyta* differ from the type of *C. simplex* in floral structure, directly attributable to the fact that the former is based on a pistillate, and the latter a staminate collection. However, the autapomorphic columnar thyrsoid panicle leaves no doubt that they are synonymous. Because no further collections have been made in the region from which the type was collected, I defer neotypification until collections from that area are available.

**20. *Cybianthus kayapii* (Lundell) Pipoly, comb. nov. (Figs. 3E, 4F, 6J, 9A–F).** *Weigelia kayapii* Lundell, Wrightia 6:118. 1980. TYPE: PERU. AMAZONAS: Camino de chichijam, entsa, 300 m, 2 May 1973 (fr), R. Kayap 723 (HOLOTYPE: MO; ISOTYPE: LL-TEX).

*Monoaxial treelet to 1(–2) m tall. Stems terete, (0.6–)1–1.7 cm diam., glandular-papillate at first, glabrescent. Cataphylls alternate in a high spiral, coriaceous, subulate, 15–45 mm long, 0.5–2(–3.5) mm wide. Leaves pseudoverticillate; blades chartaceous, oblanceolate to oblanceolate-oblong, (22–)31.3–55.5 cm long, 8.5–19.6(–23) cm wide, apically acute or broadly rounded to a small acutish tip, mucronate, the mucron to 0.5 mm long, the blade gradually tapering to an abruptly obtuse base appearing auriculate, to 1.5 cm wide, midrib slightly raised above, prominently raised below, the secondary veins 12–16 pairs, with prominent marginal and submarginal collecting veins, slightly sunken above, prominently raised below, glabrous above, with rufous hydropots below; petiole deeply canaliculate, 1–2 cm long, ca. 3.5–*

4 mm diam., densely glandular-papillate adaxially. *Staminate inflorescence*: a pyramidal, bipinnate panicle, (3)5.5–29 cm long, 5–15(–26) cm wide, the branches racemose, densely glandular-papillate, succulent, then drying hyaline; peduncle 3–5.5 cm long; branch bracts membranaceous, subulate, 6.5–8 mm long, 0.5–1.5 mm wide; pedicels cylindrical, 1.2–1.8 mm long, sparsely glandular-papillate, glabrescent; floral bracts membranaceous, subulate, inserted on the pedicel about at middle, longer than the pedicel, 1.5–2.5 mm long, 0.1–0.2 mm wide, hyaline, densely glandular-papillate, the margin entire. *Staminate flowers* pink, heteromerous, the calyx 5-merous, the corolla 4-merous; calyx deeply membranaceous, cupuliform, 0.9–1.1 mm long, the tube 0.1–0.2 mm long, unequally divided, the lobes deltate to subdeltate, 0.6–0.9 mm long, 0.2–0.7 mm wide, highly reflexed at anthesis, apically acute, epunctate, hyaline, densely glandular-papillate, the margin glabrous, entire; corolla carnose, subrotate to rotate, 2–3 mm long, the tube 0.5–0.8 mm long, the lobes ovate, 1.5–2 mm long, 1.1–1.6 mm wide, apically acute, distally recurved 90° from tube axis at anthesis, opaque, densely glandular-granulose within and along margin, sparsely glandular-papillate along margins without, epunctate or sparingly and inconspicuously pellucid punctate, the margin entire; stamens 2.2–2.9 mm long, subequal to corolla lobe or exserted, the tube conspicuous, carnose, 0.5–0.8 mm long, hyaline, glabrous, elobate, the apically free portions of the filaments terete, 1.6–2.2 mm long, free from corolla, proximally recurved, the anther oblate, 0.3–0.5 mm long, 0.5–0.8 mm wide, always wider than long, apically emarginate to retuse, basally widely cordate, the connective prominently black punctate dorsally, conspicuously black punctate ventrally; pistillode absent or to 1 mm long, 0.1–0.3 mm wide, densely glandular-papillate. *Pistillate inflorescence* as in staminate but 6.5–9(–10.5) cm long, erect, not succulent, opaque, densely glandular-papillate; peduncle 1–2 cm long; branch bracts 2–3 mm long, 0.2–0.3 mm wide; pedicels subobsolete or cylindrical, to 1.2 mm long, incrassate and accrescent in fruit to 1.5 mm long; floral bracts inserted on pedicel, longer than the pedicel, 1–1.3 mm long, 0.2–0.3 mm wide. *Pistillate flowers* as in staminate but pink to pinkish-white; calyx 0.9–1.2 mm long, the lobes unequally divided, the smaller linear-lanceolate, 0.8–0.9 mm long, 0.3–0.4 mm wide, the larger deltate, 1.0–1.1 mm long and wide; corolla rotate, 2.6–2.9 mm long, the tube 0.9–1 mm long, the lobes elliptic, 1.7–2.0 mm long, 0.6–0.7 mm wide, reflexed at anthesis, distally recurved 180° from tube axis, glabrous without, sparsely glandular-granulose within, the margin slightly irregular; staminodes very poorly developed, 1.2–1.5 mm long, the tube 0.9–1.0 mm long, the apically free portions of the filaments 0.3–0.6 mm long when developed, recurved proximally, the anthers badly formed, at times consisting of 2–3 prominently punctate glands at filament apex, or otherwise as in the stamens, ovate to subglobose, 0.2–0.3 mm long,

0.3–0.4 mm wide, apically irregular, obtuse, emarginate or retuse, basally cordate, the connective when distinguishable prominently black punctate dorsally, conspicuously punctate ventrally; pistil clavate to lageniform, 3–3.5 mm long, the ovary 0.9–1.1 mm long, 1.2–1.5 mm diam., densely papillate, the style 2.1–2.4 mm long, the stigma large, capitate, with 4 principal lobes, each irregularly laciniate-lobulate, early caducous, the placenta deeply cupuliform, the ovules 2, buried for 1/2 their length. *Fruit* depressed-globose, 5–6 mm long, 7–9 mm wide, prominently black punctate, the exocarp thin. *Bisexual inflorescence*: as in staminate but 4–13 cm long. *Bisexual flowers* as in staminate flowers but calyx 1.1–1.9 mm long, the tube 0.2–0.3 mm long, the lobes unequally divided, deltate to elliptic, the smaller 0.6–0.7 mm long and wide, the larger 0.9–1.6 mm long, 0.5–0.6 mm wide, otherwise as in pistillate flowers; corolla 2.6–2.8 mm long, the tube ca. 0.6 mm long, the lobes narrowly ovate, 2.0–2.2 mm long, 1.2–1.3 mm wide, recurved distally 90° from tube, sparsely glandular-granulose within, glandular-papillate along the margin; stamens as in staminate flower, but 2.2–2.7 mm long, always slightly shorter than corolla tube, the tube ca. 0.6 mm long, the apically free portions of the filaments 2.0–2.2 mm long, the anthers widely ovate, ca. 0.3 mm long, 0.5–0.6 mm wide, apically obtuse to emarginate, basally widely cordate; pistil 2.7–2.9 mm long, the ovary 0.8–0.9 mm long, 0.6–0.7 mm diam., densely glandular-papillate, the placenta deeply cupuliform, the ovules 2, buried for 1/2 length. *Bisexual fruit* depressed-globose, 5–6 mm long, 6–7 mm wide, prominently black punctate, the exocarp thin.

*Distribution*.—Colombia (Amazonas, Chocó, Nariño, Valle del Cauca, ), Ecuador (Chimborazo, Napo and Pichincha), Peru (Amazonas, Loreto, San Martín) and Brazil (Acre), growing at sea level–2,530 m elevation.

*Ecology and conservation status*.—*Cybianthus kayapii* is locally common in small populations at the high water line in primary “tahuampa” habitats (várzea forest), along white water rivers, or rarely in premontane habitats along the edge of pools fed by creeks. The species is not known to be cultivated and occurs only in areas where deep leaf litter and alluvial deposits are left after flooding action. It appears that the species can easily be destroyed by soil compaction as a result of trampling, and thus, it should be considered threatened.

*Etymology*.—The epithet commemorates Rubio Kayap, an indigenous Aguaruna Peruvian plant collector who worked with Brent Berlin, known for his great knowledge of Amazonian flora and ethnobotany.

*Local names and uses*.—Colombia: “Hierba de palo grande”(Spanish). Ground in crude syrups to cure cuts, internal infections, to clean the uterus and the stomach. Ecuador: “putush” (Shuar). Used against intestinal parasites and for chronic rectal bleeding (colo-rectal carcinoma °); 10 lbs. of root boiled in 8 liters of water, down to one liter; 8 cc given as enema before bed; useful

for "dysentery." Peru: "mantaya," "kugkuima muspari" (Aguaruna); used to disinfect dog and insect bites; "napi tsuake" (Huambisa). Brazil: used in curare cf. *B. Krukoff* 7663.

Representative specimens examined. COLOMBIA. Amazonas: Mpio. Leticia, Parque Nacional Natural Amacayacu, Centro Administrativo Mata-matá, trail to Amacayacu, km 4, 03° 47' S, 70° 15' W, 120 m, 25 Sep 1991 (stam. fl), A. Rudas & A. Prieto 3147 (COL, FMB, MO), 110–120 m, 28 Oct 1991 (fl bud), J. Pipoly & J. Murillo 15483 (COL, FMB, MO), Quebrada de Agua Pudre, ca. 1.5 km NE of junction with Río Amacayacu, permanent inventory plot, 200–220 m, 11 Nov 1991 (ster.), J. Pipoly et al. 15896 (COL, FMB, MO), 15 Nov 1991 (stam. fl), J. Pipoly et al. 16075 (COL, FMB, MO); Río Loretoyacu, 100 m, Oct 1946 (bisex. fl), R. E. Schultes & G. Black 8427 (US). Chocó: Bahía de Solano, 13–18 Apr 1982 (pist. fl, fr), R. Dressler 6036 (COL, FLAS, MO); Mpio. de Quibdó, Corregimiento San Francisco Ichó, Quebrada Caledonia along Caledonia Rd., 9 Apr 1987 (ster.), F. García & J. Echavarría 259-A (COL, CHOCO, MO). Nariño: Mpio. Ricaurte, Reserva Natural La Planada, 1,800 m, 13 Nov 1993 (fr), C. Restrepo 723 (BRIT, MO, PSO); La Planada, Finca Salazar, 7 km above Ricaurte, 01° 08' N, 77° 58' W, 1,750 m, 27 Nov 1981 (fr), A. Gentry et al. 35062 (MO, PSO). Nariño: Mpio. Barbacoas, Corregimiento Ortiz y Zamora, Vereda El Barro, Reserva Natural Río Ñambí, ca. 5 km W de Altaquer, faldas occidentales de la Cordillera Occidental, 01° 18' N, 78° 08' W, 1,350–1,400 m, 3 Sep 1997 (ster.), J. Pipoly, A. Cogollo, et al. 21241 (BRIT, FMB, JAUM, PSO). Valle del Cauca: Río Calima, región del Chocó, La Trojita, 5–50 m, 20 Feb 1944 (stam. fl), J. Cuatrecasas 16272 (COL, F, US); Mpio. El Cairo, Cerro del Inglés, summit, Cordillera Occidental, Serranía de los Paraguas, limit Valle/Chocó, El Cairo-Río Blanco Hwy, 1 hour in jeep from El Cairo, 2,400 m, 1 Jan 1987 (pist. fl), P. Silverstone-Sopkin et al. 2871 (CUVC). ECUADOR. Carchi: Cantón Tulcán, Parroquia Tobar Donoso, Reserva Indígena Awá, Centro El Baboso, 00° 53' N, 78° 25' W, 1,800 m, 17–27 Aug 1992 (stam. fl), G. Tipaz et al. 1706 (MO, QCNE). Esmeraldas: Cantón San Lorenzo, Parroquia Ricaurte, Reserva Indígena Awá, Comunidad Balsareño, Río Palabí, 01° 09' N, 78° 31' W, 100 m, 15–29 Apr 1991 (fl bud), D. Rubio & C. Quelal 1335 (MO, QCNE). Chimborazo: Cordillera Occidental, "El Carmen," Sibambe, 2,450 m, 22 Aug 1943 (pist. fl), M. Acosta-Solís 5544 (F, QCNA); on slopes of Chimborazo Volcano, (pist. fl, fr), A. Sodiro 100/14 (B, destr., QA?, n.v.). Morona-Santiago: Basin of Río Morona, Río Mangosiza, Nayumbime, 45 km SE of Sucua (by air), 200 m S of Don Luís Najamte's house, ca. 02° 43' S, 77° 38' W, 300 m, 27 Feb 1990 (fr), C. Limbach 140 (QCA, NY). Napo: Antisana, Shinguijino Forest, between Ríos Napo and Tena, 8 km SE of Tena, 01° 00' S, 77° 50' W, 450 m, 17 Sep 1960 (stam. fl), P. Grubb et al. 1633 (K, NY); Cantón Archidona, Carretera Hollín-Loreto, Río Huataraco, 2 hrs by foot from Guagua Sumaco, 00° 43' S, 77° 32' W, 800–1,000 m, 23–30 Aug 1989 (fl bud), C. Cerón & M. Factos 7641 (MO, QCNE); Cantón Tena, 17 Oct 1939 (stam. fl), E. Asplund 9396 (S); 3 km E of Caserío Huamaní, N of Carretera Hollín-Loreto, 00° 43' S, 77° 36' W, 1,200 m, 17 Sep 1988 (fr), F. Hurtado & A. Alvarado 503 (MO, QCNE). Pichincha: Along Rd. from Tandayapa to Mindo, 10 km from Tandayapa, 2,530 m, 16 Dec 1979 (fr), T. Croat 49361 (MO, QCNA). PERU. Amazonas: Prov. Bagua, Dtro. Imaza, Comunidad Aguaruna de Kampaenza (PUJAIM), property of Juan Mayán, 740 m, 6 Oct 1994 (pist. fl), C. Díaz et al. 7265 (BRIT, HUT, MO, USM); Prov. Condorcanqui, Dtro. El Cenepa, NE region of Marañon Drainage Basin, Río Cenepa, Comunidad Tutino, 04° 33' S, 78° 10' W, 350 m, 21 Nov 1993 (pist. fl, fr), R. Vásquez et al. 18395 (AMAZ, BRIT, HUT, MO, USM); Río Cenepa, vicinity of Huampami, ca. 5 km E of Chavez Valdívía, 04° 30' S, 78° 30' W, Quebrada Chigkishinuk, 10 Apr 1973 (fr), E. Ancuash 211 (MO), 11 Aug 1978 (pist. fl), E. Ancuash 1405 (MO); Trail one day walk from Huampami to Shaim, creek running into Nahim, 600 m, 27 Nov 1972

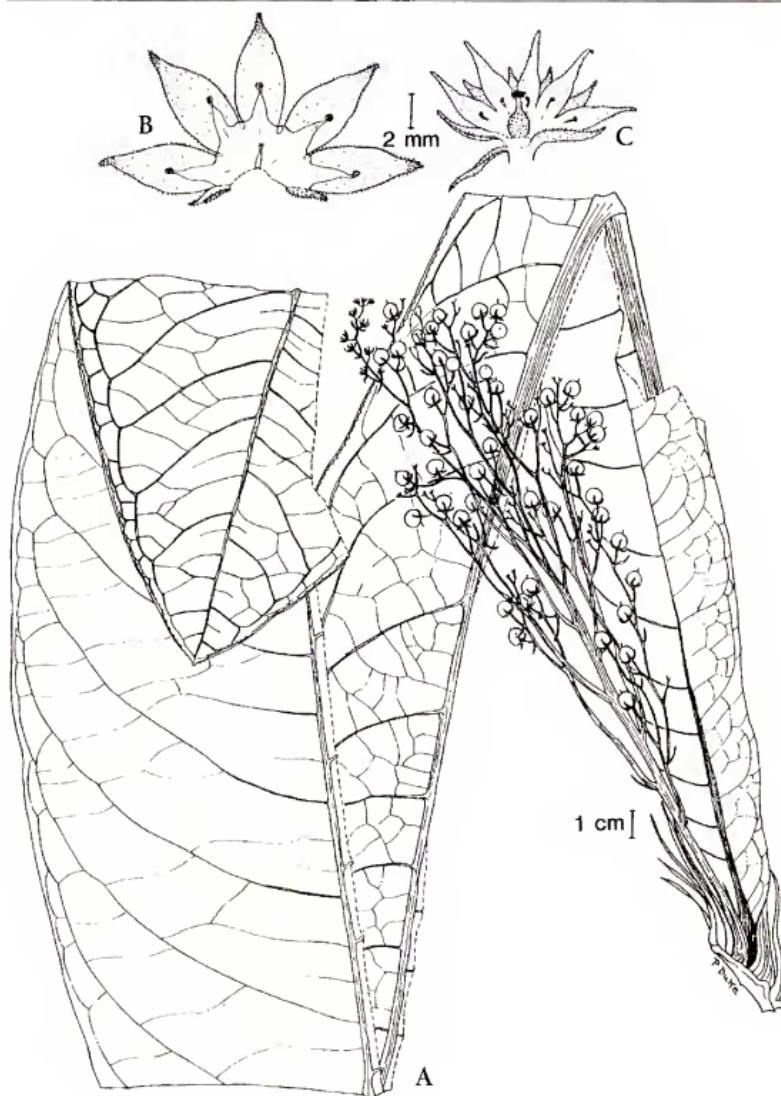


FIG. 17. *Cybianthus anthuriophyllus* Pipoly. A. Habit, showing pleiochasium with sympodial branches. B. Staminate flower, showing lanceolate-subulate corolla lobes, elongate staminal tube, and conic, vestigial pistillode. C. Pistillate flower, showing attenuate-acicular calyx lobes and obturbinate pistil. A, C, drawn from holotype. B, drawn from Bravo & Gomez 49. Figure drawn by Peggy Duke.

(stam. fl), *B. Berlin* 393 (MO); Río Santiago, W bank, 400 m beyond La Poza, 180 m, without date (fr), *F. Domínguez* 147 (MO); 800 m beyond Caterpiza, 200 m, 4 Sep 1979 (fr), *V. Huashikat* 356 (MO), 10 Sep 1979 (stam. fl), *V. Huashikat* 507 (MO), 12 Sep 1979 (bisex. fl), *V. Huashikat* 581 (MO); 26 Mar 1980 (fr), *S. Tunquí* 1110 (MO). Loreto: Prov. Maynas, Explorama Lodge, near Yanamono, between Indiana and mouth of Río Napo 03° 28' S, 72° 50' W, 103 m, 27 Jun 1983 (fr), *Gentry et al.* 42247 (AMAZ, MO, NY), 106 m, 15 Apr 1985 (fr), *R. Vásquez & N. Jaramillo* 6325 (AMAZ, MO), 28 Sep 1988 (stam. fl), *R. Vásquez & N. Jaramillo* 11100 (AMAZ, MO) 11 Jul 1990 (fr), *R. Vásquez & N. Jaramillo* 14092 (AMAZ, MO, US), 25 km NE of Iquitos, along Río Amazonas, 90 m, 03° 30' S, 72° 50' W, 26 Sep 1990 (stam. fl), *J. Pipoly et al.* 12383 (AMAZ, MO), along S border trail, 110 m, 27 Sep 1990 (stam. fl), *J. Pipoly et al.* 12490 (AMAZ, MO, NY, US, USM), (stam. fl), *J. Pipoly et al.* 12541 (AMAZ, MO, US, USM); Prov. Alto Amazonas, N slopes of Cerros Camapaquíz at Pongo de Manseriche, right bank of Río Marañón, 300–550 m, 19–21 Oct 1962 (stam. fl), *J. Wurdack* 2324 (US, USM). San Martín: Pongo de Cainarachi, Río Cainarachi, tributary of Río Huallaga, 230 m, Sep–Oct 1962 (stam. fl-except specimen at S-bisex. fl), *G. Klug* 2691 (A, F, GH, K, MO, NY, S, US). BRAZIL. Acre: Cruzeiro do Sul, Rios Juruá and Moa, 8 km above Cachoeira Grande, 07° 30' S, 73° 30' W, 27 Apr 1971 (fr), *G. Prance et al.* P12555 (IAN, MG, NY). Amazonas: Basin of Rio Javari, Mpio. São Paulo de Olivença, near Esperança, Dec 1935 (fr), *B. Kruckoff* 7663 (NY, U).

*Cybianthus kayapii* may be confused with *C. sprucei* (Hook. f.) G. Agostini, but may be recognized by the shorter petioles, heteromerous flowers and mucronate leaf apices. However, the leaf blades with mucronulate apices and subauriculate bases, and heteromerous flowers indicate *Cybianthus kayapii* is more closely related to *C. anthuriophyllus*. From *Cybianthus anthuriophyllus*, *C. kayapii* may be separated by the much smaller, flat, entire leaves with entire margins, the deltate calyx lobes with entire margins, and the carnosae corolla.

21. *Cybianthus anthuriophyllus* Pipoly, sp. nov. (Fig. 17). TYPE: ECUADOR. NAPO: Cantón Gonzalo Pizarro, Río Tigre, affluent of Río Dashino, entering from 73 km of Rd. from Lumbaque to El Reventador, 10 km S of Lumbaque, 00° 05' S, 77° 24' W, 900–1,100 m, 18–21 Feb 1987 (pist. fl, fr), *W. Palacios & D. Neill* 1584 (HOLOTYPE: US; ISOTYPES: K, MO, QCNE).

Ob folia oblanceolata ab lamina ad petiolum gradatim contracto, a primo intuitu cum *C. kayapi* confusa est, sed ab ea marginibus laminaribus revolutis serrulatisque (nec integerrimis planisque) inflorescentiis 28 (non 8–15) cm longis, pleiochasia cum ramulis floriferis cymosis (nec bipinnatipaniculatis cum ramulis floriferis racemosis) lobulis calycinis subulatis (nec ovatis) praecclare distat.

Monoaxial treelet to 0.6 m tall. Stems terete, weakly woody, ca. 2 cm diam., sparsely glandular-papillate, glabrescent. Cataphylls tightly pseudoverticillate, coriaceous, linear-subulate, 4.0–6.5 cm long, 0.3–0.6 cm wide, densely and prominently punctate-lineate, sparingly glandular-papillate, glabrescent. Leaves pseudoverticillate, erect; blades coriaceous, narrowly lanceolate, (56–) 104–110 cm long, (14.5–) 17–22 cm wide, apically broadly rounded or rounded to a minute abrupt submucronate acumen 2 mm long, the blade gradually tapering to the petiole, almost obtusish basally, midrib slightly raised above,

prominently raised below, the secondary veins ca. 42 pairs, impressed above, prominently raised below, nitid and epunctate above, purple (when fresh), inconspicuously punctate and papillate-puberulent below, the papillae erect, rufous, the margin thin, opaque, inrolled, prominently straight-serrulate, the teeth alternatively larger and smaller (ca. 1 mm and 0.5 mm long, respectively); petiole deeply canaliculate, thick, ca. 1.5 cm long, 0.8 cm diam., sparingly glandular-papillate. *Staminate inflorescence*: a pyramidal thyrsoid panicle, ca. 16 cm long, 23 cm wide, the branches psuedoracemose (sympodial), the rachis densely glandular-papillate, the peduncles longer below, shorter above; inflorescence branch bracts linear-lanceolate, 7–9 mm long, 2–3 mm wide, apically attenuate-acicular, sparsely glandular-papillate, the margin entire; floral bracts acerose, 2–3 mm long, 0.4–0.8 mm wide; pedicels 1.0–2.5 mm long, angular, thin, the longer pedicels in the lower portion of the inflorescence, the shorter ones above, densely glandular-papillate, the papillae persistent. *Staminate flowers* heteromorous, membranaceous, hyaline, the calyx (5–)6-merous, the corolla 5-merous; calyx subcotyliform 3.7–4.7 mm long, 0.4–0.7 mm wide, apically acuminate-acicular, prominently keeled, the keel thickened hyaline, epunctate, sparsely glandular-papillate except densely so along the margin, the margin entire; corolla subrotate, 7.4–10 mm long, the tube 0.7–0.9 mm long, the lobes lanceolate-subulate, 6.3–9 mm long, 2.7–3.2 mm wide, the apically long-acuminate, highly reflexed, sparsely glandular-papillate without, very sparsely glandular-granulose within above the junction within tube the margins densely glandular-papillate, entire; stamens 2.2–4.1 mm long, the staminal tube conspicuous, coriaceous, 1.4–1.8 mm long, glabrous, elobate, the apically free portions of the filaments ventrally recurved, 0.8–0.9 mm long, flat, glabrous, the anthers ovate, 0.3–0.4 mm long and wide, apically and basally emarginate, dorsifixed less than  $\frac{1}{2}$  length, the connectives prominently black punctate ventrally and dorsally; pistillode conic, vestigial–0.8 mm long or absent. *Pistillate inflorescence* a pleiochasium, with branches cymose (sympodial), the rachis densely glandular-papillate, the peduncles 1–3 cm long, longer below, shorter above; inflorescence bracts resembling cataphylls but smaller, 1.3–1.6 cm long, 1.0–1.3 mm wide, conspicuously punctate-lineate; inflorescence branch bracts linear-lanceolate, 1.2–1.5 mm long, 0.2–0.4 mm wide, apically attenuate-acicular, sparsely glandular-papillate, the margin entire; floral bracts acerose, longer than the pedicels, 0.5–1.0 cm long; pedicels angular, thin, 1.2–7.5 mm long, the longer pedicels in the lower portion of the inflorescence, densely glandular-papillate, the papillae persistent. *Pistillate flowers* as in staminate but calyx 6-merous, (2.1–)3–4.1 mm long, the tube 0.3–0.7 mm long, 0.5–1.0 mm wide, apically long-attenuate-acicular; corolla (from dried remnants) subrotate, hyaline, 5.0–7.1 mm long, the tube 1.0–1.3 mm long, the lobes linear-subulate, 4.0–5.8 mm long, 1.1–1.5 mm wide at base, apically

subulate, highly reflexed, twisted and distally recurved at anthesis; staminodia 1.2–1.3 mm long, the staminodial tube 0.9–1.2 mm long bearing well-developed lobes alternate with the apically free filaments, the filaments 0.3–1.1 mm long, flat, glabrous, the antherodes malformed, mostly consisting of undifferentiated tissue surrounding prominent black punctations or suborbicular and 0.1–0.5 mm long, 0.1–0.6 mm wide, always wider than long, apically emarginate, dorsifixated slightly less than  $\frac{1}{2}$  length, the connectives prominently black punctate dorsally; pistil obturbinate, 2.5–3.0 mm long, the ovary 1.0–1.5 mm long, 0.8–1.3 mm wide, densely papillate and prominently black punctate, the style 1.3–1.7 mm long, densely glandular-papillate, the stigma large, capitate, lobes, the lobes lacinate, each lobe to 0.4 mm long, early caducous, the placenta widely conic, bearing 4 uniseriate, exposed ovules, the ovules on the periphery of the placenta. Bisexual fruit pink, globose, 4–6 mm long and diam., the punctuation prominent, brown when fresh (teste coll.), red or black upon drying, the exocarp thin.

*Distribution.*—Amazonian (“Oriente”) Ecuador and adjacent Peru (Loreto), 160–300(–1,100) m elevation.

*Ecology and conservation status.*—*Cybianthus anthuriophyllus* grows in primary tropical wet forest and premontane wet forest on *terra firme* above the high water contour. It is found in primary forest as well as in secondary, but it is not known whether the plant is cultivated in secondary forest situations. At this time, the species can be considered locally common but not threatened.

*Etymology.*—The specific epithet refers to the unique shape of the adult leaves, held erect *in vivo* and reminiscent of *Anthurium crassinervium* (Araceae).

*Local names and uses:*—Ecuador: “namákuk” (Achuar Jívaro); “Acuar” (dialect unknown); “challuo panga” (Quichua). Peru: “kutúkupish,” “takushia,” “mutúpash,” “kurúp” (Mayna Jívaro), “sierra panga” (Quichua). Leaves crushed and used as a fish poison (W. Lewis et al. 14051); inner stem is scraped and an infusion given to dogs to drink to improve their hunting abilities and to enhance their stamina (W. Lewis et al. 11153); stem is scraped and its juice put into a dog’s nose to produce sneezing (W. Lewis et al. 10475), or to “make it an attack dog against thieves” (Lewis et al. 12853).

**PARATYPES.** ECUADOR. Napo: Cuyabeno-Punta Arenilla; Sep 1981 (stam. fl), E. Bravo & P. Gómez 49 (QCA); Canton Orellana, Yasuní National Park, Maxus Rd. and pipeline construction project km 10, 00° 29' S, 76° 34' W, 250 m, 29 Jun 1994 (fr), N. Pitman 448 (MO, QCNE). Pastaza: Kapawí (Amuntai), río Pastaza; Village area, 02° 31' S, 76° 48' W, 235 m, 25–29 Jul 1989 (ster.), W. Lewis et al. 14051 (MO). PERU. Loreto: Prov. Alto Amazonas, Puranchim, Río Sinchiyacu, 02° 50' S, 76° 55' W, 200 m, 3–7 Dec 1988 (ster.), W. Lewis et al. 14390 (MO); Washintsa and vicinity, Río Huasaqa, 03° 20' S, 76° 20' W, 185 m, 16–26 Jun 1986 (ster.), W. Lewis et al. 11153 (MO); Prov. Loreto: Nueva Jerusalém and vicinity, Río Macusari, 02° 55' S, 76° 15' W, 220–300 m, 29 Dec 1985–3 Jan 1986 (fr), W. Lewis et al. 10475 (MO); Pampa Hermosa and vicinity, Río Corrientes, 1 km S of junc-

tion with Río Mucusari, 03° 15' S, 75° 50' W, 160 m, 3–20 Dec 1985 (stam. fl), W. Lewis et al. 10340 (MO); Vista Alegre, Río Tigre, 02° 40' S, 75° 35' W, 240 m, 17 Mar 1987 (ster.), W. Lewis et al. 12853 (MO).

*Cybianthus anthuriophyllus* is unique within subgenus *Comomysine* by its small, marginal pectinate leaf serrations and pleiochasic inflorescence, appearing paniculate, but with sympodial primary and secondary branches, and thus, cymose. The leaves appear subsessile, with the blade gradually tapering to the deeply canaliculate petiole, a feature found otherwise only in its closest congener, *Cybianthus kayapii*. However, *Cybianthus anthuriophyllus* is clearly distinct from *C. kayapii* because of the inrolled, pectinate-serrulate leaf blade margin, the much longer, pleiochasic inflorescence, and subulate calyx lobes. The extremely long cataphylls are the best developed in the subgenus.

V. *Cybianthus* subgenus *Triadophora* (Mez) G. Agostini, Acta Biol. Venez. 10:164. 1980. *Weigeltia* subgenus *Triadophora* Mez in Engl., Pflanzenr. IV. 236(Heft 9):291. 1902. TYPE SPECIES. *Weigeltia schlimii* (Hook. f.) Mez in Engl. = *Cybianthus schlimii* (Hook. f.) G. Agostini.

*Correlliana* D'Arcy, Ann. Missouri Bot. Gard. 60:442. 1973. TYPE SPECIES. *Correlliana spectabilis* (Standl.) D'Arcy = *Cybianthus schlimii* (Hooker f.) G. Agostini.

As here interpreted, *Cybianthus* subgenus *Triadophora* is monotypic. Its only species, *C. schlimii*, is easily recognized by its monoaxial habit and autapomorphic rufous glandular tomentum of malpighiaceous trichomes, leaf blades with subepidermal fibers and pseudocataphylls (here defined as petiolate cataphylls). The first full description of *Cybianthus schlimii* is provided, along with complete synonymy and complete exsiccatae for Ecuador and Peru, and representative ones for other areas.

22. *Cybianthus schlimii* (Hook. f.) G. Agostini (Fig. 3D, 6K, 6L), Acta Biol. Venez. 10:165. 1980. *Comomysine schlimii* Hook. f. in Benth. & Hook., Gen. Pl. 2:644. 1876. *Weigeltia schlimii* (Hook. f.) Mez in Engl., Pflanzenr. IV. 236(Heft 9):291. 1902. *Correlliana schlimii* (Hook. f.) D'Arcy, Ann. Missouri Bot. Gard. 60:443. 1973. TYPE: COLOMBIA. META: Llano de San Martín, 300 m, Jan 1856 (stam. fl), J. Triana 7594 (HOLOTYPE: K; ISOTYPES: COL, LE, MA, P).

*Weigeltia multiflora* A.C. Smith., Bull. Torrey Bot. Club 60:387. 1933. syn. nov. *Correlliana multiflora* (A. C. Sm.) D'Arcy, Ann. Missouri Bot. Gard. 60:445. 1973. (A. C. Sm.) G. Agostini, Acta Biol. Venez. 10:165. 1980. TYPE: BRAZIL. MATO GROSSO: Near Tabajara, upper Rio Machado, 23 Nov 1931 (stam. fl), B. A. Kruckoff 1388 (HOLOTYPE: NY; ISOTYPE: A). *Ardisia spectabilis* Standl., Publ. Field Mus. Nat. Hist. Bot. Ser. 18:893. 1938. syn. nov. *Weigeltia spectabilis* (Standl.) Lundell, Wrightia 4:169. 1971. *Correlliana spectabilis* (Standl.) D'Arcy, Ann. Missouri Bot. Gard. 60:443. 1973. *Cybianthus spectabilis* (Standl.) G. Agostini, Acta Biol. Venez. 10:165. 1980. TYPE: COSTA RICA. ALAJUELA: Cataratas (Los Angeles) de San Ramón, Apr 1935 (stam. fl), A. Brenes 20530 (HOLOTYPE: F; ISOTYPES: CR, F).

*Weigeltia triandra* Aspl., Bot. Not. 1939:802. 1939. TYPE: COLOMBIA. CAUCA: Near Distrito El Tambo, 900 m, 31 Jul 1936 (stam. fl), K. von Steinen 919 (HOLOTYPE: S).

*Weigeltia schlimii* (Hook. f.) Mez var. *intermedia* Moldenke, Phytologia 2:242, 1947. TYPE: COLOMBIA. VALLE DEL CAUCA: Pacific coast, Río Cajambre, San Isidro, 5–100 m, 2–5 May 1944 (stam. fl.), J. Cuatrecasas 17312 (HOLOTYPE: NY; ISOTYPES: COL, F-2 sheets).

*Monoaxial tree* to 5 m. Stem terete, 0.8–2.0 cm diam., the wood dense, minutely rufous glandular appressed tomentose, the trichomes malpighiaceous, early glabrescent. *Pseudocataphylls* produced only irregularly, chartaceous, subulate, ca. 2.0–3.0 cm long, 0.5–1.0 cm wide, apically acute, mucronate, densely rufous puberulent, black lineate-punctate, the margin entire; petiole subobsolete, to 0.2 cm long. Leaves tightly pseudoverticillate; blades chartaceous, elliptic, oblong or oblanceolate, 25–65 cm long, 5.5–20 cm wide, apically acute or sub acuminate, mucronulate, the mucro often sclerified, the acumen 0.5–3.0 cm long, base long-attenuate, the blade decurrent on the upper portion of the petiole, midrib slightly elevated above, prominent below, the secondary veins 9–13 pairs, prominent, the marginal veins loop connected, conspicuously striolate by subepidermal fibers, these visible above and below, sparsely rufous puberulent above, moderately puberulent below, at times glabrescent, hydropotes absent, sparsely to densely punctate or lineate-punctate below, the margin opaque, irregular, entire to roughly serrate; petioles canaliculate, 1.0–3.0(–10) cm long, 0.5–1.0 cm diam., abruptly swollen basally, puberulent, glabrescent. *Staminate Inflorescence* a pinnate or bipinnate columnar panicle 13–40 cm long, 3–20 cm wide, the rachis densely glandular-papillate and rufous puberulent, the flowering branches racemose; peduncle 8–15 cm long; inflorescence bract chartaceous, ovate, 9–15 mm long, 2.4–4.5 mm wide, apically acute, densely rufous glandular puberulent, conspicuously black punctate and lineate-punctate, the margin opaque, entire; inflorescence branch bracts membranaceous, linear, 10–13 mm long, 1.9–2.1 mm wide, apically narrowly acute, mucronulate, minutely rufous puberulent, orange furfuraceous lepidote, densely and conspicuously black lineate-punctate, the margin opaque, entire; floral bracts membranaceous, subulate, 0.8–1.3 mm long, 0.2–0.4 mm wide, sparsely rufous puberulent, the margin entire; pedicel terete, 2.0–4.5 mm long, prominently black punctate, densely papillate and rufous puberulent. *Staminate flowers* 3(–4)-merous, light purple, then dull yellow; calyx chartaceous, cupuliform, 0.9–1.8 mm long, the tube 0.3 mm long, the lobes subdeltate, 0.7–1.6 mm long, 0.9–1.2 mm wide, apically acute, densely rufous puberulent, glabrescent, densely and prominently black punctate, the margin flat, wide, hyaline, densely ciliolate, the cilia often caducous; corolla rotate, chartaceous, 3.0–5.0 mm long, the tube hyaline, 0.8–1.0 mm long, the lobes elliptic or oblong, 2.2–4.0 mm long, 1.6–2.2 mm wide, apically obtuse to rounded, subcucullate, involute, distally recurved 180° relative to tube, sparsely rufous puberulent without, very sparsely glandular-granulose within basally, often glabrescent, very densely and prominently black punctate except margin hyaline, irregular, glabrous,

entire; stamens 2.4–3.5 mm long, the tube membranaceous, inconspicuous, 0.8–1.0 mm long, hyaline, epunctate, glabrous, elobate, the apically free portions of the filaments 1.8–2.3 mm long, sparsely or epunctate, sparsely rufous puberulent at first, glabrescent, the connective prominently punctate, or inconspicuously so, the punctuation orange, red or black, the anthers cordate, 0.5–0.6 mm long, 0.7–1.0 mm wide, apically subacute to rounded, base deeply cordate, dorsifixed at point less than 1/5 distance from apex; pistillode none or conic, to 1.0 mm long, densely and prominently black punctate and rufous papillate. *Pistillate inflorescence* as in staminate but more columnar, (3.5–)8.0–18.5 cm long, (2.0–)3.5–6.0 cm wide, the branches subcorymbose to rarely racemose; peduncle 1.5–6.8 cm long; inflorescence bract ovate to elliptic, 4.5–12 mm long, 1.9–4.0 mm wide, conspicuously black punctate; inflorescence branch bracts 5–15 mm long, 0.5–2.5 mm wide; floral bracts 0.9–2.0 mm long, 0.3–0.6 mm wide; pedicels terete, 2.0–4.0 mm long, accrescent to 5.0 mm long and incrassate to 2.0 mm diam. in fruit. *Pistillate flowers* as in staminate but 3-merous, calyx purple, corolla yellow; calyx subcotyliform, 1.8–2.0 mm long, the tube 0.2–0.3 mm long, the lobes subdeltate to widely ovate, 1.6–1.8 mm long, 1.6–2.2 mm wide, apically acute, the margin slightly erose, conspicuously long glandular-ciliate, the cilia often caducous; corolla 4.2–5.0 mm long, the tube 0.3–0.5 mm long, the lobes oblong, 3.2–4.5 mm long, 2.3–2.6 mm wide, apically obtuse, somewhat cucullate, reflexed ca. 45° from tube axis, densely puberulent without, sparingly glandular-granulose basally within; staminodes to 2.5 mm long, the tube membranaceous, inconspicuous, to 0.5 mm long, the filaments adnate to corolla lobe ca. 0.5 mm long, then apically free to 1.0 mm long, thick, terete, rarely punctate, the antherodes cordate, ca. 0.6 mm long, 0.7–0.8 mm wide, apically acute to apiculate, base widely cordate, the connective punctate, prominently or not; pistil clavate to obnapiform, 4.0–5.2 mm long, the ovary 1.8 mm long, 0.5–1.6 mm wide, prominently black punctate and rufous puberulent, the style to 1.3 mm long, densely rufous puberulent, the stigma capitate to lobed, 3(–4)-lobed, the placenta deeply cupuliform, bearing 2 ovules exposed apically. *Fruit* globose, 1.0–1.3 cm long, 1.0–2.0 cm diam., at maturity, the exocarp bright orange to red-orange, prominently black punctate.

*Distribution.*—From the Atlantic Slope (Dpto. Río San Juan) Nicaragua, to state of Pando, Bolivia and adjacent Amazonia of Brazil, 0–1,800 m.

*Ecology and conservation status.*—*Cybianthus schlimii* occurs in a variety of habitats, from lowland to premontane tropical moist, wet and pluvial forest. It is locally common, but restricted to primary forest. Therefore, it should be considered threatened.

*Etymology.*—The species is named for Louis Joseph Schlim, a Belgian plant collector working for J.J. Linden in Brussels, who collected extensively around

Caracas to the Venezuelan Andes, and from there, to the grasslands of Meta and the Sabana de Santafé de Bogota, Colombia, during the period 1841–1852. Schlim also collected with Nicolas Funck later in Venezuela.

*Local names and uses.*—Peru: “napi tsuake” (Huambisa).

Representative specimens examined. NICARAGUA. Río San Juan: El Relos, midpoint between El Castillo and Delta de San Juan, 0–50 m, 23 Mar 1961 (stam. fl), *G. Bunting & L. Licht* 775 (F, NY). COSTA RICA. Alajuela: 15 km NW of Arenal by air, 2 km NW of Nuevo Arenal on Rd. to Tilarán, then 3 km NE on Rd. to San Rafael de Guatuso, then 2 km W on Rd. to Finca Core, 10° 34' N, 84° 54' W, 700 m, SE side of Lago Core, 30 Apr 1983 (fr), *R. Liesner et al.* 15093 (CR, MO, WIS). Heredia: Zona Protectora, N slopes of Volcán Barba, between Río Peje and Río Guacimo, along Quebrada Cantarana, 300–400 m, 18 Jan 1983 (stam. fl), *M. Grayum & G. Shatz* 3170 (CR, DUKE, MO); Finca La Selva, Río Puerto Viejo 2 km E of jet with Río Sarapaquí, 10° 26' N, 84° 00' W, 100 m, 14–17 Jun 1968 (stam. fl), *W. Burger & R. Stolze* 5803 (CR, F, MO, NY). Limón: Near Finca Castilla, 30 m, 24 July 1936 (ster), *C. Dodge & V. Goerger* 9283 (F, MO). San José: Estación Carrillo, Cañon del Río Sucio, 450–700 m, 12 Nov 1983 (pist. fl), *I. Chacón & G. Herrera* 1720 (CAS, CR, MO, NY). PANAMA. Bocas del Toro: Cerro Bonyic, above Quebrada Hurón, 180–400 m, 13 Apr 1968 (fr), *J. Kirkbride & J. Duke* 610 (MO). Colón: Base of Cerro Bruja, along Río Escandaloso, above Mina Boquerón, No. 2, 47.5 km from Transístmian Hwy on Rd. to Salamanca, 09° 50' N, 79° 32' W, 10–200 m, 18 Mar 1982 (stam. fl), *S. Knapp & W. J. Kress* 4282 (MO, NY, PMA). Darién: Río Tuquesa, Tuquesa Mining Co. camp, Charco Peje, 250 m, 7 Jul 1975 (stam. fl), *S. Mori* 7015 (MO, SCZ). Panamá: Cerro Campana, 800 m, 22 Jun 1967 (fr), *T. Croat* 17167 (MO). San Blas: Trail from Río Estadí to Cerro Banega, 300–530 m, 09° 23' N, 78° 51' W, 21 Dec 1985 (stam. fl), *G. de Nevers & H. Herrera* 6642 (CAS, MO, PMA). COLOMBIA. Antioquia: 6 km E of Guapa, 53 km S of Turbo, 240 m, 13 May 1945 (stam. fl), *O. Haught* 4660 (US); Mpio. Anorí, Corregimiento de Providencia, Buenos Aires, 500–600 m, 4 Feb 1972 (fr), *D. Sejarto* 3205 (HUA, MO, NY); Vicinity Planta Providencia, 26 km S, 23 km W (by air) of Zaragoza, 07° 13' N, 75° 03' W, valley of Río Anorí between Dos Bocas and Anorí, 1 Jun 1976 (fr), *J. Shepard* 323 (COL, WIS); Vicinity Medellín, 20 Aug 1927 (stam. fl), *R. Toro* 356 (MEDEL, NY); Medellín-Bogotá Hwy, sector Río Samaná–Río Claro–San Luís, 400–1,000 m, 24 Aug 1982 (fr), *J. Hernández & S. Hoyos* 483 (COL, HUA); Mpio. Urrao, Boundary of Parque Nacional Natural Las Orquídeas, Vereda Calles, Permanent Inventory, Premontane Rainforest, left bank of Río Calles, 06° 32' N, 76° 19' W, 1,450–1,500 m, 30 Nov 1993 (ster.), *J. Pipoly et al.* 17406 (BRIT, JAUM, MO). Boyacá: Region of Cerro Chapón, extreme W part of Boyacá, NW of Bogotá, 2,300 m, 31 Jul 1932 (fr), *A. Lawrence* 370 (A, NY, S); El Umbo region, 1,000 m, 12 Oct 1932 (stam. fl), *A. Lawrence* 530 (A, BM, F, G, GH, MO, NY, S, U, UC, US). Chocó: Mpio. Quibdó, Quebrada La Platina, Hwy to Medellín, 25 Sep 1983 (fr), *L. Arias et al.* 134 (MO); Mpio. San José del Palmar, along Río Torito (affluent of Río Habita), W slopes, 850–950 m, 15 Mar 1980 (fr), *E. Forero et al.* 7350, 16 Mar 1980 (fl bud), *E. Forero et al.* 7393 (COL, MO), Vereda Portachuelo, Hacienda Barro Blanco, 1,350 m, 15 Jan 1983 (fr), *P. Franco et al.* 1325 (COL); Río Mecana, ca. 10 km E of Mecana, 06° 15' N, 77° 25' W, 100 m, 7 Mar 1983 (stam. fl), *A. Gentry & A. Juncosa* 41072 (COL, MO, JAUM), 710–880 m, 8 Jan 1984 (stam. fl), *A. Juncosa* 1769 (COL, MO, JAUM); Mpio. Novita, vereda Curundo, left bank, Río Ingara, 550 m, 1 Dec 1983 (fr), *P. Franco et al.* 1059 (COL); Río Nuquí, 400 m, 25 Jan 1947 (stam. fl), *O. Haught* 5479 (COL, US); La Mojarra, upriver from Istmina, 05° 12' N, 76° 37' W, 30–60 m, 5 Nov 1983 (fr), *A. Juncosa* 1255 (COL, JAUM, MO, NY); S of Río Condoto, between Quebrada Guarapo and Mandinga, 120–180 m, 22–28 Apr 1939 (fr), *E. Killip* 35675 (COL, US). Cundinamarca: Cordillera

Bogotá, 2,000 m, Sep 1855 (fr), *J. Triana* 4 (BM). **Meta:** Near Salitre, 6 Jan 1876 (stam. fl), *E. André* 1151, 7 Jan 1876 (ster), *E. André* s.n. (K); Caño Tigre, between Caño Aguas Claras and Caño Grande, 4.5 km SW of Villavicencio, 04° 07' N, 73° 39' W, 500–550 m, 24 Feb 1943 (pist. fl), *F.R. Fosberg* 20148 (COL, US); Llano de San Martín, (stam. fl, pist. fl mixed), *H. Karsten* s.n. (LE-2 sheets). **Nariño:** Mpio. Barbacoas, Corregimiento Ortíz y Zamora, Vereda El Barro, Reserva Natural Río Ñambí, ca. 5 km W de Altaquer, faldas occidentales de la Cordillera Occidental, 01° 18' N, 78° 08' W, 1,350–1,400 m, 1 Sep 1997 (stam. fl), *J. Pipoly*, *A. Cogollo* et al. 21095 (BRIT, FMB, JAUM, PSO), 21144, 21149, 1,450–1,500 m, 2 Sep 1997 (fr), *J. Pipoly*, *A. Cogollo* et al. 21483 1250–1,350 m, 8 Dec 1997 (fr), *J. Pipoly*, *A. Cogollo* et al. 21598 (BRIT, JAUM, PSO). **Norte de Santander:** Ocaña, 1200 m, May 1846–52 (stam. fl), *L. Schlim* 686 (BR-3 sheets, F-2 sheets, G-BOIS-2 sheets, G-DEL, MA-2 sheets). **Santander:** 8 km SE of Barrancabermeja, Río Opón, 200 m, 28 Aug 1954 (stam. fl), *R. Castañeda* 4746 (COL), vicinity Barrancabermeja, between Ríos Sogamoso and Colorado, 100–500 m, S of Río Sogamoso, Camp Mesa, 8 Jan 1935 (stam. fl), *O. Haught* 1502 (A, COL, F, NY, US). **Valle del Cauca:** Cordillera Occidental, W slope, along Río Sanquiniñí, left side, La Laguna, 1,250–1,400 m, 13 Dec 1943 (stam. fl), *J. Cuatrecasas* 15474 (VALLE); Bahía Málaga, Quebrada Algeria, new Rd. to military base, 0 4° 02' N, 77° 22' W, 50 m, *A. Gentry* et al. 53326 (COL, MO, US); Bank of Río Dagua, Río San Juan, below Queremal, to the right of river between km 52 and 53, 1,300–1,500 m, 19 Mar 1947 (fr), *J. Cuatrecasas* 23855 (COL, F-3 sheets); Calima Dam, 1600–1700 m, 17 Sep 1966 (stam. fl), *S. Espinal* 2109 (MO, VALLE). Without locality, date, (stam. fl), *J. Matis* 449 (MA), 2919 (MA), 3907, 5102a (MA, US), *Warscewicz* s.n. (B-destr., Photo-F Neg. 4858). **ECUADOR.** **Carchi:** Trail along plain above Tobar-Donoso and Río Guape, 01° 10' N, 78° 18–31' W, 280–450 m, 18 Feb 1984 (stam. fl), *W. Hoover* 1194 (MO), SE Trail, Gualpi Chicó Area of Awá Reserve, near encampment, 00° 58' N, 78° 16' W, 1,330 m, 19 Jan 1988 (stam. fl), *W. Hoover* et al. 2815 (MO, QCNE), Gualpi Medio Community, Awá Reserve, 900 m, 21 May 1992 (bud), *C. Quelal* et al. 764 (MO, QCNE) El Pailón, 45 km below Maldonado, along path to Tobar Donoso, 800 m, 1 Dec 1979 (fr), *M. Madison* & *L. Beise* 7201 (AAU, F, QCNE, SEL); Cantón Tulcán, Reserva Indígena Awá, Parroquia Tobar Donoso, sector El Baboso, 00° 53' N, 78° 20' W, 1,600 m, 3 Oct 1991 (fl, fr), *G. Tipaz* et al. 260 (BRIT, MO, QCNE), (fr), 311 (BRIT, MO, QCNE), Centro El Baboso, 00° 53' N, 78° 25' W, 1,800 m, 17–27 Aug 1992 (fr), *G. Tipaz* et al. 1950 (BRIT, F, MO, QCNE). **Esmeraldas:** Cantón San Lorenzo, Reserva Indígena Awá, Cañón del Río Mira, 10 km W of Alto Tambo, Comunidad "La Unión," 01° 02' N, 78° 26' W, 250 m, 16–26 Mar 1991 (fr), *D. Rubio* et al. 1262 (MO, QCNE). **Sucumbíos:** Cantón Lago Agrio, Reserva Cuyabeno, Laguna Grande, Near NEOTROPIC Cabins, 00° 00' S, 76° 11' W, 230 m, 15 Nov 1991 (stam. fl), *W. Palacios* et al. 9269 (BRIT, MO, QCNE). **Zamora-Chinchipe:** Cantón Nangaritza, Valle del Río Nangaritza, Miazí, 04° 18' S, 78° 40' W, 1,200 m, 10 Dec 1990 (pist. fl), *W. Palacios* 6734 (BRIT, MO, QCNE), Behind military camp, 04° 16' S, 78° 42' W, 970 m, 20 Oct 1991 (stam. fl), *W. Palacios* et al. 8483 (BRIT, MO, QCNE). **PERU.** **Amazonas:** Camino de chichijam, entsa, 180–250 m, 2 May 1973 (stam. fl), *R. Kayap* 728 (MO); Valle del Río Santiago, 03° 50' S, 77° 40' W, Quebrada Caterpiza, 2–3 km behind Caterpiza, 200 m, 4 Jan 1980 (stam. fl), *S. Tunquí* 549 (MO). **Loreto:** Prov. Maynas, Guarñición Pijuayal, near Pebas, 130 m, 7 Sep 1988 (stam. fl), *C. Díaz* et al. 566 (MO). **Ucayali:** Prov. Padre Abad, Boquerón del Padre Abad, 400 m, 20 May 1969 (fr), *J. Schunke* 3068 (F-2 sheets, US, USM). **BRAZIL.** **Amazonas:** Mpio. Humaytá, on plateau between Río Livramento & Río Ipixuna, 7–18 Nov 1934 (stam. fl), *B. Kruskoff* 7290 (A, NY, S, U); São Paulo de Olivença, near Esperança, Dec 1935 (ster.), *B. Kruskoff* 7663 (K, NY), Behind São Paulo de Olivença, 16 Aug 1973 (fr), *E. Lleras* et al. P17315 (GB, INPA, MG, NY); km 500, Manaus-Humaytá Rd., 17 Sep 1980 (stam. fl), *S. Lourie* et al. 52 (INPA,

MG, NY). Mato Grosso: Near Tabajara, upper Rio Machado, Nov-Dec 1931 (stam. fl), B. Kruckoff 1377 (A, NY). Rondônia: São Lourenço, cassiterite mine, 20 km N of S. Lourenço on Rd. to "A Macisa" Mine, 15 Jul 1979 (stam. fl), C. Calderón et al. 2852 (INPA, US). BOLIVIA. Pando: W bank of Rio Madeira, 3 km above Abuna, 13 Nov 1968 (stam. fl), G. Prance et al. 8388 (LPB, MG, INPA, NY).

The "pseudocataphylls" referred to in the description are poorly developed and do not occur in a regular phyllotactic spiral as is found in subgenus *Comomysine*. Likewise, their morphology is essentially that of a leaf arrested at different stages of development, and as such, do not have a distinctive morphology.

Northern populations from Nicaragua and Costa Rica corresponding to the type of *C. spectabilis* (as *Ardisia spectabilis*) differ in their smaller flowers and anther connectives sometimes eglandular, a feature which is more a function of ecotype than anything else. Eglandular anthers and entire leaves may be found in very lowland wet forest populations in the Darién of Panama, and the Chocó of Colombia.

The type of *Weigelia multiflora* A.C. Sm. represents populations whose inflorescences are less branched (although the duplicates of the type collection vary in that regard) and the largest flowers of the species. They, like many of the Panamanian populations, have entire leaves and are otherwise inseparable from the type of *Weigelia triandra* Asplund.

The collections of Kayap from Amazonian Peru are referred to this species, despite their longer petioles.

**VI. Cybianthus subgenus Weigelia (A. DC.) G. Agostini, Acta Biol. Venez. 10:156. 1980.** *Weigelia* A. DC., Trans. Linn. Soc. London, Bot. 17:102. 1834. *Cybianthus* sectr. *Weigelia* (A. DC.) Miq. in Mart., Fl. Bras. 10:299. 1856. TYPE SPECIES: *Salvadora surinamensis* Spreng. Tent 7. 1828. =*Cybianthus surinamensis* (Spreng.) G. Agostini.

Polyaxial dioecious or rarely, monoecious shrubs or small trees. Roots positively geotropic. Trunk distinguishable, growth dynamics following Rauh's Architectural Model (in ours), rarely Corner's Model (not in Ecuador or Peru) sensu Hallé et al. (1978). Bark grey to beige, thick, vertically fissured. Branchlets sessile furfuraceous lepidote or rarely, rufous tomentose, often glabrescent Cataphylls and pseudocataphylls absent. Leaves alternate, rarely subopposite, with minute sessile rufous furfuraceous lepidote scales abaxially. Inflorescence a pinnate or bipinnate panicle, rarely a simple raceme; peduncle 0.5–2 cm long. Flowers 4- rarely 5-merous; calyx valvate, crenate or rarely entire, glabrous or rarely glandular-ciliolate, punctations red or black, prominent or not; corolla rotate to subrotate, the lobes imbricate, glandular-granulose only at the junction with the corolla tube, the punctations red or black, conspicuous, or rarely, prominent; stamens and staminodes united to form an inconspicuous or conspicuous tube, the tube without lobes alternating

with the apically free filaments, the filaments one to three times longer than the anthers, terete, and recurved proximally, the anthers subglobose, or widely ovoid, versatile, apically acute to emarginate, basally widely cordate, dehiscent by wide longitudinal slits, the connectives mostly prominently red or black punctate; pistil conic, pyriform or obturbinate, the ovary translucent glandular-lepidote or glabrous, the style capitate-lobate, the lobes entire; pistillode minutely conic, or at times, absent. *Fruit* globose or depressed-globose.

*Cybianthus* subgenus *Weigelia* contains approximately 46 species in South America and the Caribbean. Five species are known from Ecuador and Peru; they are restricted to the lowlands and premontane forests on the lower slopes of the Western Cordillera in Ecuador and the Eastern Cordillera in Ecuador and Peru.

#### KEY TO SPECIES OF CYBIANTHUS SUBGENUS WEIGELIA

1. Inflorescence bipinnately paniculate; petioles canaliculate; staminate flowers with stamens shorter than corolla.
  2. Branchlets terete; leaf blades apically long attenuate-subulate, basally long-attenuate.
    3. Branchlets 2.5–4 mm diam., minutely rufous-lepidote; leaves pseudoverticillate, the blades membranaceous, prominently black punctate-lineate below, margins subentire to obtusely serrate; petioles 0.5–1.5 cm long; calyx membranaceous, 1–1.3 mm long, the lobes obtuse, prominently punctate, glandular-ciliate along the margin. .... 23. *C. poeppigii*
    3. Branchlets 5.5–6 mm diam., minutely ferruginous tomentellous; leaves alternate, the blades chartaceous, minutely and prominently puncticulose below, margins entire; petioles 2–3.5 cm long; calyx chartaceous, 0.7–1 mm long, the lobes acuminate, epunctate, glabrous along the margin. .... 24. *C. pseudolongifolius*
  2. Branchlets angulate or winged; leaf blades apically acute or short-acuminate, basally acute or cuneate.
    4. Branchlets angulate, 8–10 mm diam., conspicuously rubiginous punctate-lineate; leaf blades coriaceous, conspicuously rubiginous punctate-lineate below; petioles 2.5–3 cm long; staminate calyx membranaceous, 1.4–1.6 mm long, the lobes apically acute; staminate corolla membranaceous, 2.3–2.5 mm long; stamens 1.8–2 mm long. .... 25. *C. vasquezii*
    4. Branchlets winged, (2.5–3–)5–6 mm diam., epunctate; leaf blades chartaceous, inconspicuously pellucid punctate; petioles 2–2.5 cm long; staminate calyx chartaceous, 1–1.2 mm long, the lobes apically subacuminate; staminate corolla chartaceous, 1.2–1.3 mm long; stamens 1–1.1 mm long. .... 26. *C. cenepensis*
  1. Inflorescence racemose; petioles marginate; staminate flowers with stamens exerted or equaling corolla. .... 27. *C. nanayensis*

23. *Cybianthus poeppigii* Mez in Engl., Pflanzenr. IV. 236(Heft 9):218. 1902. TYPE: PERU. LORETO: PROV. Maynas. Tocache, without elevation, without date, (stam. fl), E. Poepplig s.n. (HOLOTYPE: W).

*Weigeltia albiflora* A. C. Sm., Amer. J. Bot. 27:546. 1940, *syn. nov.* *Cybianthus albiflorus* (A.C. Sm.) G. Agostini, Acta Biol. Venez. 10:157. 1980. TYPE: COLOMBIA. CHOCÓ: Andagoya, 70–110 m, 20–30 Apr 1939 (stam. fl), E. Killip 35372 (HOLOTYPE: NY; ISOTYPES: A, BM, US-2 sheets).

*Cybianthus gentryi* Lundell, Wrightia 5:195. 1975, *syn. nov.* TYPE: COLOMBIA. CHOCÓ: Cerro Malí, on border with Panama, 1,200–1,400 m, 17 Jan 1975 (stam. fl), A. Gentry & S. Mori 13709 (HOLOTYPE: LL; ISOTYPE: MO).

*Shrub or small tree to 4(–7) m tall. Branchlets thin, terete, 2.5–3.5(–4) mm diam., minutely rufous-lepidote. Leaves in loose pseudoverticels; blades membranaceous, elliptic, oblanceolate, lanceolate or rarely obovate, (6–)6.8–18.5(–24) cm long, (2.2–)3.5–6.5(–8.5) cm wide, apically acuminate to subacuminate-attenuate, basally cuneate to acute, not decurrent on the petiole, midrib depressed above, prominently raised below, the secondary veins 7–12(–14) pairs, rufous lepidote above and below early glabrescent above, tardily glabrescent below, sparsely black punctate and densely black punctate-lineate below, the margin flat, subentire to obtusely serrate; petioles canaliculate, 0.5–1.5 mm long, minutely rufous-lepidote. Staminate and pistillate inflorescences monomorphic, bipinnately paniculate, somewhat pyramidal, sometimes malformed and appearing racemose, 8–15 cm long, 8–10 cm wide, the rachis densely glandular-papillate, the flowers racemose; inflorescence bracts unknown; floral bracts membranous, linear-lanceolate, 1–2.5(–3.5) mm long, 0.3–0.8(–1.2) mm wide, apically attenuate, densely glandular-papillate, epunctate, the margin glandular-ciliate; pedicels cylindrical, (0.7–)1.6–1.9(–2.5) mm long, densely glandular-papillate. Staminate flowers 4-merous, yellow or yellowish-green; calyx membranaceous, cotyliform, 0.8–1.3 mm long, the tube 0.2–0.3 mm long, glabrous, the lobes widely ovate to suborbicular, (0.6–)1 mm long, (0.5–)0.6–1 mm wide, apically obtuse, prominently punctate, the margin hyaline, irregular, erose-serrulate apically, densely glandular-ciliate; corolla membranaceous, rotate, (1.7–)1.8–2.2(–2.6) mm long, the tube (0.3–)0.4–0.6 mm long, glabrous without, glandular-granulose within, the lobes suborbicular, (0.9–)1.2–1.6(–2) mm long, (0.8–)1.2–1.7(–2) mm wide, apically obtuse, prominently punctate, glabrous without, glandular-granulose medially at stamen base within, the margin hyaline, irregular, erose; stamens (1–)1.4–1.6 mm long, the tube inconspicuous, hyaline, (0.3–)0.4–0.6 mm long, densely glandular-granulose within, the apically free portions of the filaments (0.3–)0.4–0.5 mm long, the anthers ovate-triangular, 0.3–0.4 mm long, 0.2–0.3 mm wide, apically rounded, basally obtuse, the connective epunctate; pistillode conic, 0.3–0.4 mm long, densely rufous glandular-papillate. Pistillate flowers as in staminate, but calyx 1–1.3 mm long, the tube 0.2–0.3 mm long, the lobes deltate to widely elliptic, 0.8–1 mm long and wide, the margin opaque; corolla 2–2.3 mm long, the tube, 0.6–0.7 mm long, the lobes 1.4–1.6 mm long, 0.6–0.7 mm wide,*

glandular-granulose within above filament junction with tube, the margin often erose; staminodes resembling stamens but 1–1.3 mm long, the staminodial tube ca. 0.6 mm long, the apically free portions of the filaments to 0.3 mm long, the antherodes suborbicular, to 0.2 mm long and wide; pistil obnapiform, 1.2–1.3 mm long, the ovary 0.8–0.9 mm long, 0.3–0.5 mm wide, densely translucent-lepidote, the style 0.3–0.4 mm long, the stigma bilobed, the lobes decurrent, ca. 0.4 mm long. *Fruit* depressed-globose, 3.5–4.5 mm long, 4.5–6 mm diam. when dried, red, then black at maturity, inconspicuously punctate, exocarp thin.

*Distribution.*—Known from the easternmost Darién of Panama south to Amazonian Peru and Brazil, 100–1,800 m.

*Ecology and conservation status.*—*Cybianthus poeppigii* is a broad ranging polymorphic ochlospecies, occurring in primary premontane wet and pluvial forests, from the transition zone with lowland forests, to the transition zone to cloud forests. Recent fieldwork in the Cordillera Occidental of Colombia has shown it is a conspicuous element of primary pluvial premontane forests, with a density of approximately 20 individuals per hectare, clustered mostly along the margin of the windward side of the forest, and along streambanks above the high water level. While locally common, its restricted primary habitat verifies its threatened status.

*Etymology.*—The specific epithet honors Eduard F. Poeppig (1798–1868), professor at Leipzig, explorer and plant collector, who made numerous valuable contributions to our knowledge of the Peruvian Amazon Basin.

Representative specimens examined. PANAMA. Darién: Serranía del Darién, Panama/Colombia frontier, Cerro Tacaracuna, Cerro Mali, summit, 1,400 m, 17 Jan 1975 (stam. fl), A. Gentry & S. Mori 13665 (LL-TEX, MO-2 sheets), W ridge, Cerro Tacaracuna, 1,800–1,850 m, 31 Jan 1975 (fr), A. Gentry & S. Mori 14023 (COL, LL-TEX, MO-2 sheets); Serranía de Pirré, Cerro Pirré, above Cana Gold Mine between Ríos Cana and Escucha Ruido, 1,000–1,310 m, 27 Jul 1976 (stam. fl), T. Croat 37785 (LL-TEX, MO, NY, PMA), SW ridge leading to Alturas de Nique, Panama/Colombia border, 1,100–1,200 m, 30 Dec 1980 (stam. fl), R. Hartman 12401, 12461 (MO). COLOMBIA. Antioquia: Mpio. De Anorí, Corregimiento Providencia, Río Anorí Valley, between Dos Bocas and Anorí, 400–900 m, 24–31 May 1973 (fr), D. Soejarto et al. 4090 (A, COL, F, HUA, MO); Mpio. Sonsón, Río Verde region, Hacienda "La Soledad," 1,430–1,800 m, 21 Jan 1947 (stam. fl), G. Gutierrez 1186 (F, MEDEL, MO, UC); Mpio. San Carlos, Corregimiento Alto de Samaná, Vereda Miraflores, 820–900 m, 15 Jun 1989 (stam. fl), R. Fonnegra et al. 3076 (BRIT, HUA). Mpio. Urrao, Parque Nacional Natural Las Orquídeas, Vereda Calles, Permanent Inventory, right bank, Río Calles, 06° 32' N, 76° 19' W, 1,450 m, 27 Nov 1993 (ster.), J. Pipoly et al. 17183 (BRIT, JAUM, MO), 1,450–1,500 m, 29 Nov 1993 (ster. seedling), J. Pipoly et al. 17360 (BRIT, JAUM, MO). Chocó: Mpio. San José del Palmar, vereda "El Tabor," 1,540 m, 18 Jan 1983 (pist. fl), P. Franco et al. 1469 (COL). Vaupés: Río Pacoa (tributary of Río Apaporís), 00° 20' N, 71° 20' W, 300 m, 7–12 Feb 1952 (pist. fl), R. Schultes & I. Cabrera 15423 (COL, GH, US). ECUADOR. Morona-Santiago: Macurna, 50 km N of Macas, 21 Mar 1973 (pist. fl), H. Lugo 3633 (GB); Río Cuyes and Boboiza-Gualaquiza Rd., 03° 25' S, 78° 35' W, 800 m, 1 Nov 1986 (stam. fl), W. Palacios 1466 (MO, US). Napo: Between Tena and Napo. 1 Jan

1940 (stam. fl), *E. Asplund* 10209 (S), 7 Jan 1940 (stam. fl), *E. Asplund* 10302 (S); Tena, 400 m, 3 Apr 1935 (stam. fl), *Y. Mexia* 7206 (NY, UC, US); Reserva Biológica Jatun Sacha, 8 km from Puerto Misahualló, right bank, Río Napo, 01° 04' S, 77° 36' W, 450 m, *C. Cerón* 2585 (MO, QCNE). Pastaza: Mera, 1,100 m, (stam. fl), *E. Asplund* 18717 (S), 1,500 m 29 Dec 1958 (stam. fl), *G. Harling* et al. 9764 (GB); Loracachi, on path to Lagartococha, 01° 38' S, 75° 58' W, 25 May 1980 (fr) *J. Jaramillo* et al. 30984 (AAU, QCA), 31 May 1980 (fr), 31579 (AAU, QCA). Tungurahua: Río Negro, 1,200 m, 13 Mar 1980 (pist. fl), *G. Harling & L. Andersson* 17255 (GB); 10 km E of Paquisha, 1,400–1,500 m, 13 Apr 1985 (stam. fl), *G. Harling & L. Andersson* 24097 (GB). PERU. Amazonas: Río Santiago, 3 km behind Caterpiza, 14 Nov 1979 (fr), *V. Huashikat* 1248 (MO, NY); Tingo María, 25 Jul 1940 (stam. fl), *E. Asplund* 12497 (S). Pasco: Prov. Oaxapampa, Cabeza de Mono, Palcazu Valley, 10° 20' S, 75° 18' W, 320 m, 11 Jun 1983 (fr), *A. Gentry* et al. 41880 (MO); Ozuz to Río Lobo, 10° 19' S, 75° 16' W, 400–500 m, 10 May 1985 (fr), *R. Foster & B. d'Achille* 10013 (F). San Martin: Quebrada de Haquisha (right margin Río Huallaga), Prov. Mariscal Cáceres, Dtrro. Tochache Nuevo, 400–500 m, 1 Jul 1974 (stam. fl), *J. Schunke* 7106 (MO, NY). BRAZIL. Amazonas: Near Juruá, Dec 1900 (stam. fl), *E. Ule* 5160 (HBG).

*Cybianthus poeppigii* was mistakenly placed by Agostini (1980) in subgenus *Cybianthus*, but the versatile, dorsifixed anthers clearly place it in subgenus *Weigeltia*. I had reported earlier (Pipoly 1983a) that *Cybianthus albiflorus*, its synonym, was closely related to *C. lawrencei* Moldenke. However, the bipinnate inflorescences with racemose flowers, stamens shorter than the corolla and usually long petioles indicate that *Cybianthus poeppigii* is more closely related to *C. longifolius* Miq., a vicariant species of the southwestern Amazon Basin of Brazil and adjacent Bolivia. The glandular granules of the staminal and staminodial tubes represent a unique (autapomorphic) character state within the genus.

The holotype of *Cybianthus poeppigii* is stamine, as are those of its taxonomic synonyms. The type of *Weigeltia albiflora* (*Cybianthus albiflorus*) represents populations with entire, irregularly margined leaves, but is otherwise qualitatively identical with that of *C. poeppigii*. Likewise, the type of *Cybianthus gentryi* Lundell represents isolated montane populations of the Darién/Chocó regions, and exhibits more notable lineate-punctations, much smaller leaves, and abbreviated inflorescences. According to annotations by Killip at US, description of another taxon was at one time contemplated, based on the fact that the populations of this species from near Tena, Ecuador, have roughly serrate leaf margins.

24. *Cybianthus pseudolongifolius* Pipoly, sp. nov. (Fig. 18). TYPE: PERU. PASCO: Prov. Oaxapampa, Palcazu Valley, Cabeza de Mono, 5–6 km W of Iscosacín 10° 12' S, 75° 14' W, 325 m, 13–19 Apr 1983 (fr), *D. Smith* 3808 (HOLOTYPE: MO; ISOTYPES: US, USM).

Quoad folia magna chartacea, inflorescentias bipinnatifidipaniculatas, pedicellos cylindricos, lobos calycinis ovatos, ca. 1/3 connatos, petiolas canaliculatos *C. longifolius* arcte accedens, sed ab ea ramulis teretibus (non angulatis), 5.5–6 (non 3.5–4) mm diammetris, laminis anguste oblanceolatis (non ellipticis vel lanceolatis) desuper sordidis (non nitidis) ad apices longi-

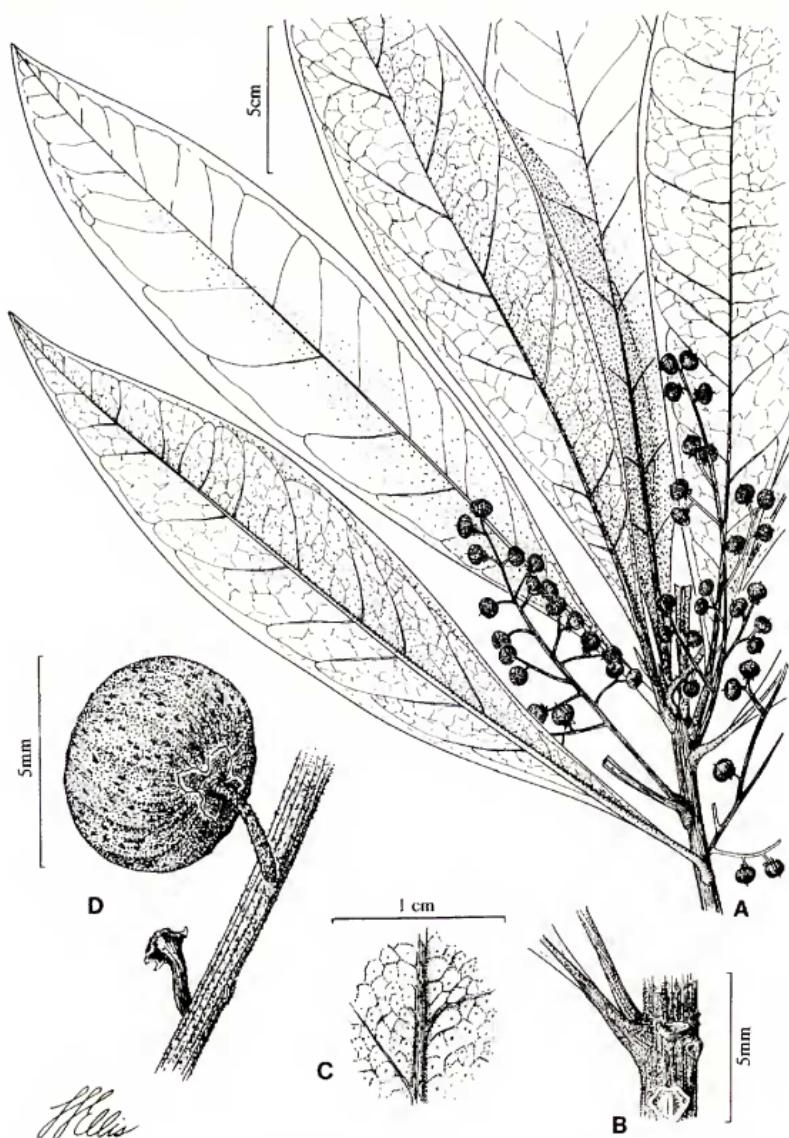


FIG. 18. *Cybianthus pseudolongifolius* Pipoly. A. Habit, showing bipinnate panicles. B. Peduncle and axillant leaf, showing canaliculate petiole. C. Detail of prominently puncticulose abaxial leaf surface. D. Pedicel, calyx and fruit, showing hyaline and erose calyx lobes. A & C, drawn from isotype; B & D, drawn from holotype. Figure drawn by Linda Ellis.

attenuatis et subulatis (nec acutis vel acuminatis) ad bases longi-attenuatis (nec acutis), inflorescentiis 8–13 (non 15–20) cm longis, pedicellis 2.8–3 (nec 0.6–1) mm longis necnon fructibus depresso-globosis (nec globosis) atque minute cosatis (nec laevibuss) perfacile discenda.

*Treelite* to 3 m tall. *Branchlets* terete, 5.5–6 mm diam., densely and minutely ferruginous tomentellous. *Leaves* alternate; blades chartaceous, narrowly oblanceolate, (22–)26.5–33(–36.5) cm long, (5–)6.5–8.5 cm wide, apically long attenuate, subulate, basally long-attenuate, decurrent on the petiole, sordid and glabrous above, pallid, minutely and prominently pellucid puncticulose and minutely ferruginous puberulent below, midrib slightly raised above, prominently raised below, the secondary veins 13–18 pairs, the margin entire, glabrous, flat; petioles canaliculate, (2–)2.5–3(–3.5) cm long, glabrous above, minutely ferruginous puberulent below. *Staminate inflorescence*: unknown. *Pistillate inflorescence*: a lax bipinnate panicle, 8–13 cm long, 1.5–4 cm wide, densely ferruginous puberulent, glabrescent; secondary inflorescence bracts unknown; floral bracts unknown; pedicels cylindrical, 2.8–3 mm long, densely ferruginous puberulent; *Pistillate flowers* unknown; fruiting calyx chartaceous, cotyliform, 0.7–1 mm long, the tube 0.3–0.4 mm long, the lobes ovate, 0.5–0.7 mm long, 0.5–0.6 mm wide, apically acuminate, densely and prominently red punctate, the margin hyaline, erose, epunctate, glabrous. *Fruit* depressed-globose, 3–4 mm long, 5–6 mm diam., inconspicuously pellucid punctate, minutely longitudinally costate.

*Distribution*.—Known only from the type.

*Ecology and conservation status*.—*Cybianthus pseudolongifolius* appears to be restricted to the lowland primary forest of the eastern Andean slopes. The Oxapampa Province of Pasco is home to numerous Peruvian endemics, and it would not be surprising if the species was of extremely limited distribution or endemic. With only one specimen known, no determination can be made of its true conservation status.

*Etymology*.—The specific epithet refers to its general likeness to *Cybianthus longifolius* Miq., a lowland black water river species from Amazonian Brazil and Venezuela.

*Cybianthus pseudolongifolius* is most closely related to *C. longifolius*, but differs by its terete branchlets, 5.5–6 mm in diameter, narrowly oblanceolate leaf blades that are sordid above, long-attenuate and subulate apically and long-attenuate basally, longer inflorescences, much longer pedicels and depressed-globose, minutely costate fruits. The Oxapampa region of Pasco contains a number of endemic species and disjunct taxa and as such, is one of the most important underexplored areas in Peru.

25. *Cybianthus vasquezii* Pipoly, sp. nov. (Fig. 19). TYPE: PERU. LORETO: Prov. Alto Amazonas, Capahuari Norte, 02° 45' S, 76° 25' W, 220 m, 7 Jun 1981 (stam. fl), R. Vásquez & N. Jaramillo 1993 (HOLOTYPE: MO; ISOTYPES: AMAZ, BRIT, E, NY, US, USM).

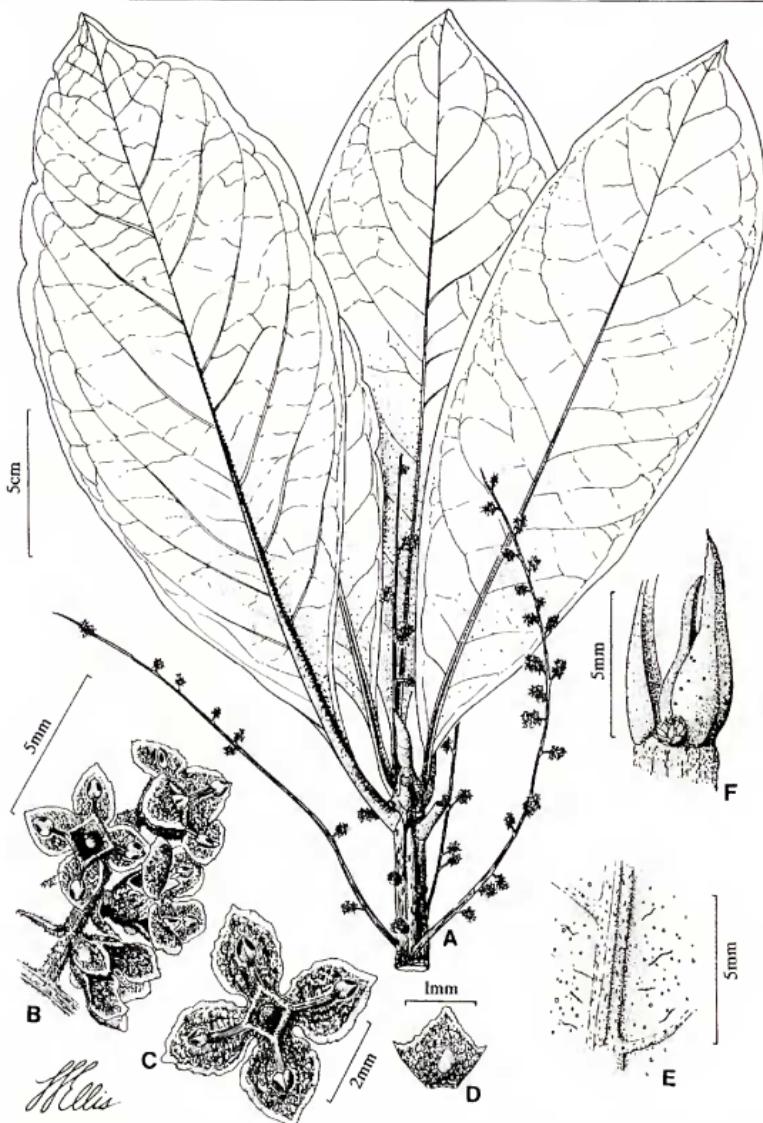


FIG. 19. *Cybianthus vasquezii* Pipoly. A. Habit, showing angulate, punctate-lineate branchlet. B. Inflorescence branch, showing racemose-glorerulate floral arrangement. C. Open corolla. D. Abaxial calyx lobe surface. E. Abaxial leaf surface, showing minute furfuraceous scales and prominent punctate-lineations. F. Branchlet apex. A–F, drawn by Linda Ellis, from holotype.

Propter ramos crassos manifeste angulatos, folia coriacea subter pallida ad apices subacuminata ad bases acuta, petiolos canaliculatos, inflorescentias anguste bipinnatipaniculares, ramos inflorescentiares dense spicatos vel glomerularatos lobos calycines grosse crenatos *C. potiae* valde affinis sed ab ea ramulis rubiginoso-punctato-lineatis (non epunctatis), folia pseudoverticillata (non alterna), laminis oblanceolatis (nec ellipticis), (9)–10–13(–15.3) (nec 6.5–8) cm latis, petiolis 2.5–3 (nec 1.5–2) cm longis, inflorescentiis 12–25 (nec 3–6) cm longis, corollae lobis ovatis (nec ellipticis) ad apices acute rotundatis (nec emarginatis) ad bases abrupte constrictis (nec rectis), secus margines grosse crenatis (nec integerrimis) confeste separabilis.

Terrestrial dioecious tree to 8 m tall. Branchlets angulate, 8–10 mm diam., densely and minutely rubiginous furfuraceous-lepidote, conspicuously rubiginous punctate-lineate below. Leaves pseudoverticillate; blades coriaceous, oblanceolate, (21)–26–34.5 cm long, (6.5)–9–12.2 cm wide, apically acute to sub acuminate, basally acute, decurrent on the petiole 4–7 mm, glabrous above, very minutely rubiginous furfuraceous-lepidote below, the midrib slightly raised above, prominently raised and rubiginous punctate-lineate below, the secondary veins 7–10 pairs, slightly impressed above, prominently raised below, the margin entire, flat; petioles canaliculate, 2.5–3 cm long, swollen below to 0.5–0.7 cm diam. basally, rubiginous furfuraceous-lepidote at first, early glabrescent, conspicuously rubiginous punctate-lineate. *Staminate inflorescence*: a bipinnate panicle (12)–14–17.5(–25) cm long, 2–3 cm wide; peduncle (1)–2–3.5 cm long; secondary inflorescence bracts chartaceous, linear, 2–3 mm long, 0.3–0.6 mm wide, apically attenuate, densely glandular-papillate, the margin entire; branches racemose-glomerulate (0.5)–1–1.5 cm long; floral bracts membranaceous, linear, 1.6–1.8 mm long, 0.3–0.4 mm wide, apically attenuate, densely rubiginous puberulent; pedicels cylindrical, 0.3–0.5 mm long, glabrescent. *Staminate flowers* 4-merous, pink; calyx membranaceous, coryliform, 1.4–1.6 mm long, the tube ca. 0.2 mm long, the lobes ovate, 1.2–1.4 mm long, 1–1.1 mm wide, apically acute, sparsely and inconspicuously orange punctate, glabrous, the margin coarsely crenulate, glabrous; corolla membranaceous, subrotate, 2.3–2.5 mm long, the tube 0.2–0.3 mm long, densely glandular-granulose, the lobes ovate, 2–2.3 mm long, 1.7–1.8 mm wide, apically acutely rounded, abruptly constricted basally, inconspicuously orange punctate without, sparsely glandular-granulose behind the base of the filaments, the margin hyaline, coarsely crenate, glabrous; stamens 1.8–2 mm long, the tube carnose, squarrose, 0.2–0.3 mm long, the filaments terete, 1.1–1.2 mm long, slightly curved proximally, the anthers ovate, 0.5–0.6 mm long, 0.6–0.7 mm wide, apically rounded, basally cordate, the connectives inconspicuously orange punctate dorsally; pistillode obturbinate, 0.5 mm long, 0.6 mm diam., the stigma truncate, minutely lobed. *Pistillate inflorescence* as in staminate but (3.5)–5.5–9.5 cm long, the branches glomerulate. *Pistillate flowers* as in staminate but red, except white on corolla lobe apices; calyx obconic, 1.3–1.7 mm long, the tube 0.6–0.8 mm long, the lobes very widely ovate to suborbicular, 0.7–

1.2 mm long, 0.8–1.2 mm wide, apically broadly rounded, corolla 2.3–2.7 mm long, the tube 0.6–0.8 mm long, the lobes suborbicular, 1.5–1.7 mm long, 1.5–1.8 mm wide, the margin irregular, hyaline, staminodial tube 1–1.3 mm long, the apically free portions of the filaments 0.4–0.5 mm long, the antherodes 0.3–0.4 mm long and wide; pistil obnapiform, 2.2–2.4 mm long, 1.3–1.5 mm diam, the ovary 1.3–1.5 mm long, the style thick, 1.1–1.3 mm long, the stigma capitate, 4-lobed, the lobes recurved, the placenta deeply cupuliform, the ovules 2–3, imbedded. *Fruit* unknown.

*Distribution.*—Known only from the Department of Loreto, in Alto Amazonas and Loreto Provinces, Peru, at 160–220 m elevation.

*Ecology and conservation status.*—*Cybianthus vasquezii* occurs in primary *terra firme* lowland forest, with scattered white sand areas. Label data do not allow determination of whether this species occurs on the laterite or on the sands. Because it is known only from two gatherings, its conservation status is unknown. However, its importance as a tonic in Mayna Jívaro culture may indicate it is locally common.

*Etymology.*—It gives me great pleasure to dedicate this species to a great friend and colleague, Ing. Rodolfo Vásquez Martínez, Assistant Curator and Director of the Flora of Peru Program of the Missouri Botanical Garden. Vásquez is an indefatigable collector, a forestry engineer, dendrologist, taxonomist and author of numerous publications on uses of Peruvian forest products, economic plants of the Peruvian Amazon, and *Florula of the Biological Reserves of Iquitos*. He is a taxonomic authority on *Caraipa* and *Myristicaceae* of the Amazon Basin.

*Local names and uses.*—Peru: “sésa,” “kurúp” (Mayna Jívaro). The sap is extracted and a juice is drunk to “improve hunting ability.”

PARATYPE: PERU. Loreto: Prov. Loreto, Pampa Hermosa and vicinity, Río Corrientes, 1 km S of junction with Río Macusari, 03° 15' S, 75° 50' W, 160 m, 3–20 Dec 1985 (pist. fl), W. Lewis et al. 10306 (BRIT, MO).

*Cybianthus vasquezii* is most closely related to *C. potiae* of the eastern Amazon Basin (French Guiana and Brazil (Amapá, Bahía), but is easily recognized by the conspicuously rubiginous punctate-lineate branchlets, larger pseudoverticillate, oblanceolate leaves, longer petioles and inflorescences, ovate, apically rounded corolla lobes that are abruptly constricted basally, and coarsely crenate along the margins.

26. *Cybianthus cenepensis* Pipoly, sp. nov. (Fig. 20). TYPE: PERU. AMAZONAS: Río Cenepa, vicinity Huampami, ca. 5 km E of Chávez Valdfvia, 04° 30' S, 78° 30' W, 200–250 m, 12 Aug 1978 (stam. fl), A. Kujikat 265 (HOLOTYPE: MO; ISOTYPES: F, MO, NY, US, USM).

Ob folia chartacea oblanceolata ad apices acuminata ad bases cuneata, petiolos canalicuatos, inflorescentias anguste bipinnatipaniculatas, ad *C. buchtieni* valde affinis sed ab ea ramulis alatis (nec laevibus), petiolis 2–2.5 (non 1.5–1.8) cm longis, lobis calycinis late ovatis (nec

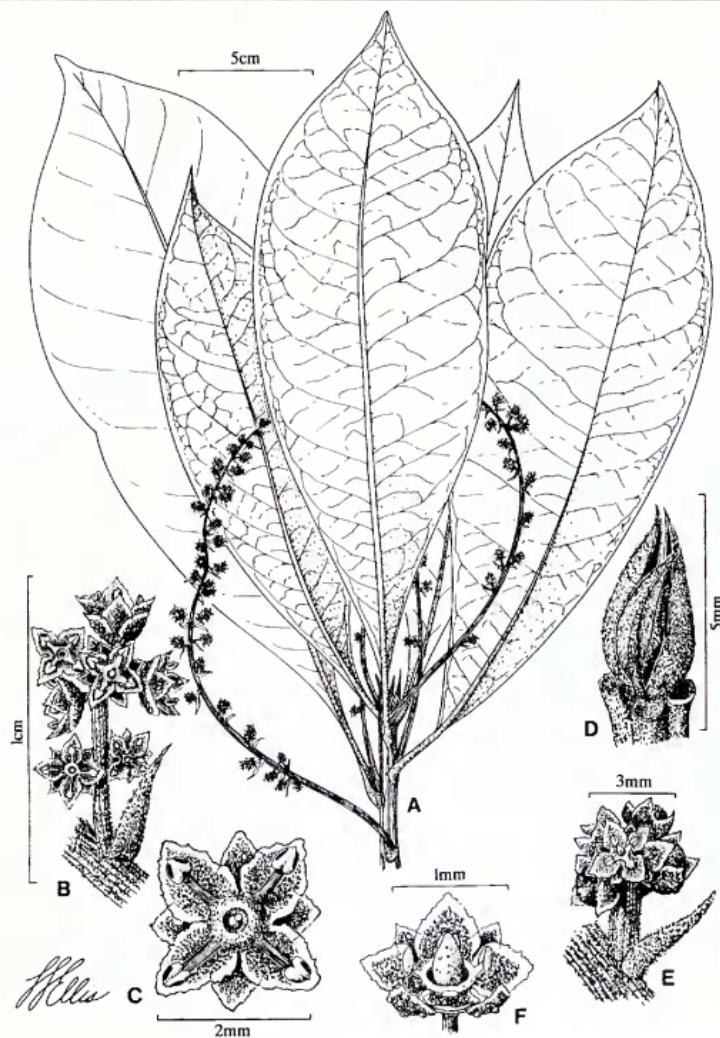


FIG. 20. *Cybianthus ceneensis* Pipoly. A. Habit, showing winged branchlets. B. Staminate inflorescence branch, showing secondary inflorescence branch bracts. C. Staminate flower, showing stamens subequal to corolla lobes, conspicuous square staminal tube, and coarsely crenate corolla lobes. D. Pistillate flower, showing ellipsoid pistil. E. Pistillate inflorescence branch, showing dense spike appearing glomerulate. D. Branchlet apex, showing puberulent vestiture. A drawn from holotype. B-D, drawn from Ancuash 522. E-F, drawn from Kujikat 306. Figure drawn by Linda Ellis.

linear-lanceolatis), grosse crenatis (nec integerrimis), lobis corollinis grosse crenatis (nec enteris) denique antheris ad apices acutis (nec rotundatis) ad bases cordatis (nec obtusis) perfacile distinguitur.

*Treelite* to 2 m tall. *Branchlets* prominently longitudinally ridged, the ridges forming small, rounded wings, (2.5–3–)5–6 mm diam., sparsely rufous puberulent, glabrescent. *Leaves* alternate; blades chartaceous, oblanceolate, (13.7–)18.5–23(–26.2) cm long, (4–)6–10 cm wide, apically acuminate, basally cuneate, glabrous above, sparsely rufous puberulent below, glabrescent, inconspicuously pellucid punctate, the margin entire, flat; petioles canaliculate, 2–2.5 cm long, sparsely rufous puberulent, glabrescent. *Staminate inflorescence* a lax bipinnate panicle, 14–18 cm long, 1–1.7 cm wide, the rachis densely rufous papillate; secondary inflorescence bracts chartaceous, linear-lanceolate, 4–4.5 mm long, 1–1.2 mm wide, apically subulate, densely rufous tomentellous, the margin irregular, entire; inflorescence branches 3–8 mm long, the flowers densely subserrate, appearing glomerulate; floral bracts chartaceous, linear, 1–1.2 mm long, 0.1–0.2 mm wide, apically subulate, densely glandular-papillate, the margin crenulate, glabrous; pedicels cylindrical, 0.2–0.3 mm long, densely glandular-papillate. *Staminate flowers* 4-merous, chartaceous, brownish-purple, 1.6–1.8 mm long; calyx cotyliform, 1–1.2 mm long, the tube 0.3–0.4 mm long, the lobes broadly ovate, 0.7–0.8 mm long, 0.6–0.7 mm wide, apically acute, prominently brown punctate, the margin hyaline, coarsely crenate, glabrous; corolla subrotate, 1.2–1.3 mm long, the tube ca. 0.1 mm long, densely glandular-granulose within, the lobes widely ovate, 1–1.2 mm long, 0.8–1 mm wide, apically subacute, glabrous and inconspicuously orange punctate without, glabrous within except under the filaments, the margin hyaline, coarsely crenate, glabrous; stamens subequaling the corolla lobes, 1–1.1 mm long, the tube conspicuous, carnose, square, 0.1–0.2 mm long, densely glandular-granulose, the filaments 0.6–0.7 mm long, the anthers ovate, 0.3–0.4 mm long, 0.4–0.5 mm wide, apically acute, basally cordate, the connective inconspicuously orange punctate; pistillode obturbinate, 0.1–0.2 mm long, 0.2–0.3 mm diam., hollow, glabrous. *Pistillate inflorescence* as in staminate but 12–14 cm long, 0.8–1.0 cm wide; secondary inflorescence bracts 3.8–4.1 mm long, 0.8–1 mm wide; inflorescence branches 3.5–6 mm long; floral bracts 1–1.2 mm long, 0.1–0.2 mm wide; pedicels 0.2–0.3 mm long. *Pistillate flowers* as in staminate but white, 1.1–1.4 mm long; calyx 0.6–0.8 mm long, the tube 0.1–0.2 mm long, the lobes 0.5–0.6 mm long, 0.3–0.4 mm wide; corolla 0.7–0.8 mm long, the tube ca. 0.1 mm long, the lobes 0.6–0.7 mm long, 0.5–0.6 mm wide; staminodes much shorter than the corolla lobes, 0.3–0.4 mm long, the tube conspicuous, carnose, circular, ca. 0.1 mm long, the filaments ca. 0.1 mm long, the anthers 0.2–0.3 mm long, 0.1–0.2 mm wide; pistil ellipsoid, 0.5–0.6 mm long, 0.2–0.3 mm diam., the style 4-lobed, the lobes curved distally, pla-

centa subobose, bearing 4 partially immersed ovules. *Fruit* globose, 6–7 mm long and in diam., prominently red punctate.

*Distribution*.—Known only from the Río Cenepa Drainage Basin, Amazonas, Peru, 200–250 m elevation, and from one disjunct population from Napo, Ecuador, very close to the Colombian border.

*Ecology and conservation status*.—*Cybianthus cenepensis* inhabits várzea forests in the Amazon of Ecuador and Peru. Despite lack of collections, it is known that the Napo and the Cenepa Rivers are shallower than many with their same volume, thus giving them strong currents. Aside from the need for much more exploration at the edge of the Amazon Basin in Ecuador and Peru, perhaps the strong current of these rivers makes the dynamics of their adjacent várzea forests different from others in Amazonia. At this time, the conservation status of this species is unknown.

*Etymology*.—The specific epithet refers to the region of Peru from which the type was collected, the Río Cenepa Drainage Basin of the Alto Amazonas Province, Amazonas Department, Peru.

*Local names and uses*.—Peru: “sauka” (Huambisa).

**PARATYPES.** ECUADOR. Napo: Cantón Orellana, Yasuní National Park, Maxus Rd. and pipeline construction project, km 15, 01° 31' S, 76° 32' W, 250 m, 30 Jun 1994 (bud), N. Pitman 461 (BRIT, MO, QCNE); Río Yasuní, periodically inundated forest ca. 80 km upriver from Nuevo Rocafuerte, 225 m, 17 Sep 1977 (fr), R. Foster 3708 (F, QCA). PERU. Amazonas: Quebrada Sasa, Río Cenepa, 250 m, 2 Jun 1973 (stam. fl), E. Ancash 522 (MO, USM); Río Cenepa, vicinity of Huampami, ca. 5 km E of Chávez Valdívía, ca. 4° 30' S, 78° 30' W, 200–250 m, 12 Aug 1978 (pist. fl), A Kujikat 306 (F, MO, USM); Quebrada Chigki Shiunk, 4° 30' S, 78° 30' W, 11 Aug 1978 (bud), E. Ancash 1412 (MO, USM).

*Cybianthus cenepensis* is closely related to *C. buchtieni* Pax of the Mapiri region in Bolivia. However, *Cybianthus cenepensis* is easily recognized by its winged branchlets, petioles 2–2.5 cm long, widely ovate and coarsely crenate calyx lobes, coarsely crenate corolla lobes, and anthers with acute apices and cordate bases. The ellipsoid pistil is also unique within the subgenus.

**27. *Cybianthus nanayensis* (J.F. Macbr.) G. Agostini, Acta Biol. Venez. 10:160. 1980. *Weigelia nanayensis* J.F. Macbr., Field Mus. Nat. Hist., Bot. Ser. 11:33. 1931. TYPE: PERU. LORETO: Lower Río Nanay, 4 Jun 1929 (stam. fl), L.L. Williams 658 (HOLOTYPE: F; fragment, G).**

*Weigelia silvestris* J.F. Macbr., Candollea 6:16. 1934. syn. nov. *Cybianthus silvestris* (J.F. Macbr.) G. Agostini, Acta Biol. Venez. 10:163. 1980. TYPE: PERU. LORETO: Mishuyacu, near Iquitos, Dec 1929 (stam. fl), G. Klug 724 (HOLOTYPE: F; ISOTYPES: NY, US).

*Conomorpha dubia* J.F. Macbr., Candollea 6:17. 1934. syn. nov. *Cybianthus dubius* (J.F. Macbr.) G. Agostini, Acta Biol. Venez. 10:158. 1980. TYPE: PERU. LORETO: Mishuyacu, near Iquitos, 24–28 Sep 1929 (pist. fl, fr), A. Killip & A. Smith 29906 (HOLOTYPE: F; ISOTYPES: NY, US) [erroneously cited as *G. Klug* 29906].

*Conomorpha loretensis* Lundell, Wrightia 6:113. 1980. syn. nov. *Cybianthus loretensis* (Lundell) Pipoly, Brittonia 33:496. 1981. TYPE: PERU. LORETO: Quistococha, near Iquitos, 18 Nov 1977 (stam. fl), A. Gentry 20763 (HOLOTYPE: LL-TEX; ISOTYPES: F, MO, NY).

*Subshrub to shrub* to 0.5(–1.5) m tall. *Branchlets* 0.2–0.5 cm thick, smooth, rufous-lepidote. *Leaves* in loose pseudoverticels; blades chartaceous to subcoriaceous, elliptic, lanceolate or oblanceolate, (7–)11–18(–25.5) cm long, (2.9–)3.5–7.5(–10) cm, apically acute to acuminate, basally acute to cuneate, midrib depressed above, prominently raised below, the secondary veins 7–16 pairs, glabrous above, sparsely and minutely rufous-lepidote below, puncticulate, the margin flat, entire; petioles marginate, (0.6–)0.9–1.5 cm long, glabrous. *Inflorescences* monomorphic, a simple raceme or rarely with a second, malformed basal branch, (1.5–)3–9.5(–14.5) cm long, the rachis densely glandular-papillate; floral bracts membranaceous, linear-lanceolate, 0.2–1.2 mm long, 0.1–0.2 mm wide, the apically long-attenuate, sparsely glandular-papillate, the margin glandular-ciliate, entire; pedicels cylindrical, (0.7–)1–1.5(–2) mm long, densely glandular-papillate. *Staminate flowers*: white to cream, 4-merous, chartaceous; calyx cotyloidiform, 1–1.3 mm long, the tube ca. 0.1 mm long, the lobes widely ovate to deltate, 0.9–1.2 mm long, 0.8–1.2 mm wide, apically acute to acuminate, medially thickened and prominently black punctate, glabrous, the margin hyaline, irregular, densely glandular-ciliolate; corolla rotate, 1.9–2.3 mm long, the tube 0.6–0.8 mm long, the lobes widely ovate to ovate, 1.3–1.6 mm long, 1.2–1.4 mm wide, apically acute to rounded, subentire or apically notched, medially thickened and prominently black punctate, glabrous without, glandular-granulose within at junction of tube and lobe, the margin hyaline, irregular, glabrous; stamens 2.2–2.5 mm long, exserted or rarely subequal to corolla, the staminal tube carbose, conspicuous, 0.5–0.7 mm long, subtruncate between the filaments, the apically free portions of the filaments terete, (1.2–)1.4–2 mm long, the anthers widely ovate, 0.32–0.36 mm long, apically rounded to obtuse, basally cordulate, the connective prominently punctate dorsally; pistillode vestigial, obclavate or tubiform, 0.7–0.8 mm long, sparsely translucent glandular-lepidote, hollow. *Pistillate flowers* as in staminate but beige to brown; calyx 2–2.1 mm long, the tube 0.1–0.2 mm long, the lobes 1.9–2 mm long, 1.9–2 mm wide; corolla cotyloidiform, 1.9–2 mm long, the tube 0.5–0.6 mm long, the lobes widely ovate, 1.2–1.4 mm long, 1.3–1.4 mm wide, apically acute to acuminate; staminodes resembling stamens, 1.2–1.3 mm long, the staminodial tube 0.5–0.6 mm long, the filaments 0.4–0.5 mm long, the antherodes subquadrate, ca. 0.2 mm long and wide, apically obtuse, basally truncate; pistil ellipsoid, 1.4–1.6 mm long, the ovary 1–1.2 mm long, 1.1–1.2 mm diam., densely translucent glandular-lepidote, the placenta cupuliform, ovules 2, partially immersed, the style truncatae, 0.3–0.4 mm long, the stigma punctiform. *Fruit* depressed-globose, 4.5–5.5 mm long, 5.5–6.5(–7) mm diam., yellow when fresh, prominently black punctate.

*Distribution.*—Endemic to the tall moist forests on white sands of the Peruvian Amazon, primarily from the Iquitos area, 100–160 m.

*Ecology and conservation status.*—*Cybianthus nanayensis* is locally common, and thrives in gaps left by large treefalls in overmature forests, and along the margins of forest margins and paths, where it occurs in a rather dense herbaceous layer. However, it does not tolerate compacted soils. With decreasing quantitites of habitat owing to logging pressures, the species should be considered threatened. As a gap species growing on nutrient deficient soils, and with very attractive fruits, *Cybianthus nanayensis* shows great promise as a potentially marketable horticultural plant.

*Etymology.*—The epithet takes its name from the river basin where it occurs, the Nanay River.

Representative specimens examined. PERU. Loreto: Prov. Loreto, Nauta, 04° 32' S, 73° 35' W, 160 m, 2 Jun 1984 (stam. fl), R. Vásquez & N. Jaramillo 5075 (AMAZ, MO, NY), (fr), R. Vásquez & N. Jaramillo 5086 (AMAZ, MO); Prov. Maynas, Allpahuayo, IIAP Experimental Station, 04° 10' S, 73° 30' W, 120 m, 20 Sep 1990 (fr), J. Pipoly et al. 12263 (AMAZ, MO, USM), 15 Aug 1990 (fr), R. Vásquez & N. Jaramillo 14204 (AMAZ, MO, US, USM), 10 Oct 1990 (stam. fl), R. Vásquez & N. Jaramillo 14465 (AMAZ, MO); Laguna Quistococha, 15 km SW of Iquitos, 8 Jul 1977 (stam. fl), J. Solomon 3466 (LL-TEX, MO); Mishiana, 30 km SW of Iquitos, Callicebus Biological Reserve, Río Nanay, 4 km S of Mishana, 19 Aug 1978 (stam. fl), R. Foster 4243 (AMAZ, F), 16 Aug 1980 (stam. fl), 4327 (F-2 sheets); Vicinity Mishana, between Río Nanay and Río Itaya, 130 m, 29 Nov 1977 (fr), A. Gentry et al. 21033 (F, MO); Between Iquitos and Sra. María de Nanay, 180 m, 31 May 1978 (stam. fl), A. Gentry et al. 22367 (AMAZ, F, MO); 03° 50' S, 73° 30' W, 25 Feb 1981 (fr), A. Gentry et al. 31479 (AMAZ, MO), 31 Dec. 1982 (mixed- stam. fl, fr), A. Gentry & L. Emmons 38776 (MO-2 sheets), 5 Aug 1990 (fr), R. Vásquez et al. 14161 (AMAZ, MO, USM); Río Nanay, May-Jun 1929 (stam. fl), L.L. Williams 657 (F); Mishuyacu, near Iquitos, 100 m, Oct-Nov 1929 (stam. fl), G. Klug 304 (F), May-Jun 1930 (stam. fl), G. Klug 1355 (F); 6 Oct. 1982 (stam. bud), R. Vásquez & N. Jaramillo 3261 (MO), 20 Jan 1985 (stam. fl), 6125 (MO); Puerto. Almendras, 03° 48' S, 73° 25' W, 122 m, 4 Jan. 1986 (pist. fl), R. Vásquez & N. Jaramillo 7070 (AMAZ, MO), 30 May (stam. bud), 7593 (MO), 20 Oct. 1986 (fr), 8073 (AMAZ, MO); Roca Fuerte (Momón), Oct-Nov 1984 (stam. fl), R. Vásquez & N. Jaramillo 5241. Madre de Dios: Prov. Tambopata, Tambopata Reserve, Río Tambopata at mouth of Río D'Orbigny, 250 m, 6 Mar 1981 (fr), A. Gentry & K. Young 32025 (AMAZ, MO, NY).

Agostini (1980) had not seen the type specimen of *Weigeltia silvestris* and included it in *Cybianthus* subgenus *Comomysrine*, probably due to matching with a herbarium misidentification of a specimen of *Cybianthus kayapii* (Lundell) Pipoly as *Weigeltia silvestris* in NY. I previously recognized *Cybianthus dubius* and *C. loretensis* as distinct taxa (Pipoly 1981) on the basis of quantitative characters, and had not seen the type of *C. silvestris*. The exserted stamens and obclavate or tubiform pistillode of the staminate flowers, and truncate style with punctiform stigma in the pistillate flowers are unique features within the subgenus.

Populations corresponding to the type of *Weigelia silvestris* have slightly larger leaves, but are otherwise indistinguishable from the type of *Weigelia nanayensis*. The type of *Conomorpha dubia* is notable only for differences attributable to the fact that it is a pistillate fruiting specimen. Fieldwork in Peru has shown that populations corresponding to the type of *Conomorpha loretensis* grow in full sun, and consequently have narrower leaves with longer petioles than those of the type of *Weigelia nanayensis*.

**VII. Cybianthus subgenus Grammadenia (Benth.) Pipoly, Mem. New York Bot. Gard. 43:47. 1987.** *Grammadenia* Benth., Pl. Hartw. 218. 1846. TYPE SPECIES: *Grammadenia marginata* Benth. = *Cybianthus marginatus* (Benth.) Pipoly.

Erect or pendent, evergreen, terrestrial, epiphytic or epipetric dioecious, bisexual, dioecious or monoecious shrubs or small trees. Roots diageotropic. Bark mostly smooth, gray or sometimes brown, cracking transversely on older parts. Trunks distinguishable, normally more or less terete, leptocaulous or rarely pachycaulous basally, growth dynamics corresponding to Rauh's Model (Hallé et al. 1978). Branchlets thin to moderately thick, terete or ridged, smooth to verruculose to verrucose, glabrous or rarely glandular-papillate apically, glandular-papillate at first in the leaf axils then glabrescent, without lenticels. Cataphylls and pseudocataphylls absent. Leaves alternate, supervolute, exstipulate, sessile, acrodromous, apically obtuse-mucronate, basally auriculate, subamplexicaul, minutely glandular-papillate along midrib above, glabrescent, glabrous below, hydropotes few or absent above, numerous below, the margins hyaline, membranaceous, prominently punctate and punctate-lineate, entire or minutely crenulate to denticulate; petioles absent. Inflorescence monomorphic, simple, axillary raceme, at times reduced to appear dichasial; inflorescence bract broadly ovate to deltate, acute, prominently punctate, the margins entire to erose, early caducous; rachis terete, straight or flexuous, minutely glandular-papillate, glabrescent; floral bracts solitary, at pedicel base, ovate to lanceolate, persistent; pedicels cylindrical to clavate, minutely glandular-papillate, glabrescent, accrescent in fruit. Flowers unisexual or bisexual, (4-)5-6(-7)-merous; perianth lobes imbricate or quincuncial or rarely and aberrantly dextrorsely contorted, prominently, conspicuously or inconspicuously punctate and punctate-lineate; calyx cotyliform, the lobes erect, at times reflexed in fruit, the margins irregular or regular, entire or minutely crenulate, glabrous or glandular-ciliate; corolla rotate, bearing a ring of glandular granules at the junction of tube and lobe, the lobes glabrous without, glabrous or rarely glandular-granulose and smooth or rugose within, the margins regular or irregular, entire or minutely crenulate; stamens and staminodes similar, connate to form a conspicuous, membranaceous or carnose tube adnate to the corolla tube, elobate or with minute lobes alternating with the anthers, the anthers and antherodes basifix, sessile

or on minute apically free filaments, quadrate or ovate, apically emarginate or rounded, basally truncate, dehiscent by apical birimose pores, usually dorsally and rarely ventrally punctate; pistil and pistillode similar, obnapiform, ellipsoid or umbonate, the ovary terete, lobed or costate, sparsely to densely translucent-lepidote, the placenta umbonate, (1-)2-3(-4) ovulate, the ovules half-immersed in the basal placenta, uniseriate or biseriate, the style short, truncate, the stigma punctiform. *Fruit* drupaceous, depressed globose, obovoid, or ellipsoid, the exocarp sometimes fleshy, the mesocarp and endocarp stony, prominently punctate-lineate, white, lavender or purple-black at maturity, one seeded, the testa corrugate, the embryo cylindrical, transverse.

A subgenus of 7 species, in the Lesser Antilles, in Mesoamerica from northern Costa Rica through Panama, in the Andes from Venezuela to southern Peru, east through the Guayana Highland and to the Serranía de Turumíqure, Anzoátegui, Venezuela. In Ecuador, two species occur. In Peru, 3 species have been recorded, of which one, *Cybianthus lineatus* (Benth.) Pipoly, formerly thought to be a Guayana Highland endemic (Pipoly 1987) is reported for the first time here.

#### KEY TO THE SPECIES OF CYBIANTHUS SUBGENUS GRAMMADENIA

- Branchlets verruculose- to verrucose-papillate or red glandular-papillate; leaves coriaceous, symmetrical; inflorescence erect, flexuous; perianth coriaceous; epipetric or terrestrial shrubs or trees of lagunas in páramos and elfin forests or in "jalca" or "pajonal" alpine savannas.
- Epipetric shrub or tree to 6 m tall; trunk leptocaulous; branchlets verruculose- to verrucose-papillate, prominently ridged, rugose when dried; leaves oblong, elliptic or lanceolate, (1.1-)1.4-2(-2.5) cm wide; fruit ovoid, then ellipsoid at maturity; plants of páramos or elfin forests. .... 28. *C. marginatus*
- Terrestrial shrub to 1.5 m tall; trunk pachycaulous; branchlets red glandular-papillate, terete, smooth when dried; leaves oblanceolate, (0.4-)0.6-1(-1.2) cm wide; fruit obovoid throughout development; plants of jalca or pajonal alpine savannas. .... 29. *C. lineatus*
- Branchlets smooth, glabrous; leaves chartaceous, asymmetrical; inflorescence lax, straight; perianth chartaceous; epiphytic shrub or tree in cloud forests below subpáramos or facultative epiphytes in montane and elfin forests. .... 30. *C. magnus*
  - Leaves not bearing hydropotens above, conspicuously black punctate and punctate-lineate below; inflorescence rachis black punctate-lineate; perianth whitish-green, prominently black punctate and punctate-lineate; anthers ovate, rounded apically; branchlets 4-7 mm diam.; fruit purple-black at maturity. .... 30a. *C. magnus* subsp. *magnus*
  - Leaves bearing hydropotens above, at least proximally, inconspicuously pellucid to orange punctate; inflorescence rachis orange punctate-lineate; perianth maroon to purple, rarely white (then pistillate), prominently orange-punctate; anthers quadrate, emarginate apically; branchlets 2.5-3.5(-4.0) mm diam.; fruit white, then lavender at maturity. .... 30b. *C. magnus* subsp. *asymmetricus*

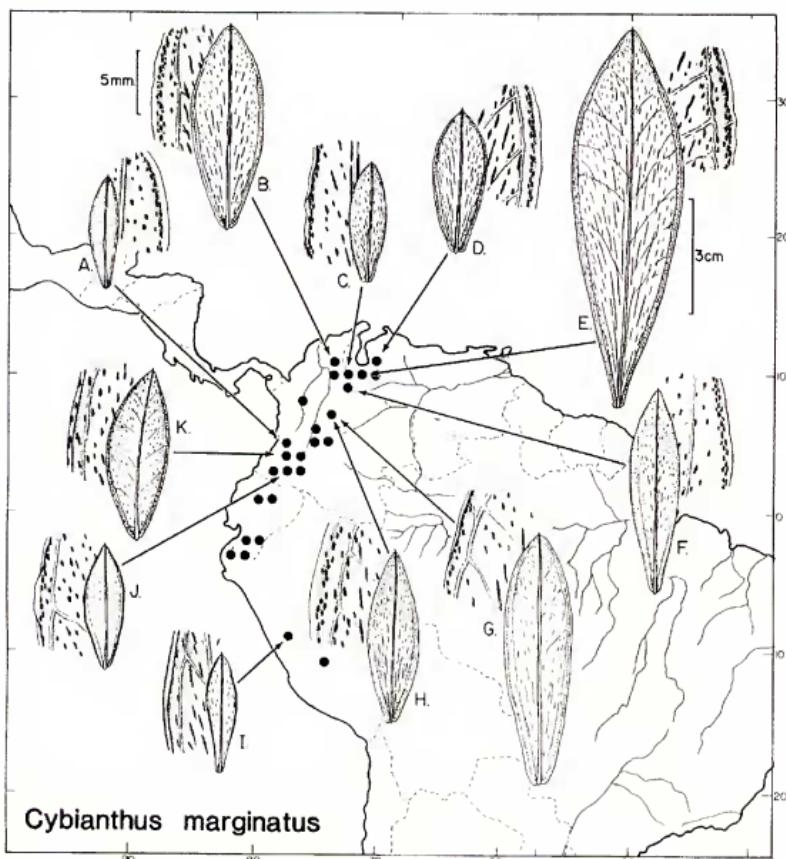


FIG. 21. Pictorialized distribution of *C. marginatus*. A-K, Variation in leaf shape, marginal venation and punctuation; note prominent apical mucron, sessile leaf base typical of subgenus *Grammadenia*. A-K, drawn from: A. Cuatrecasas 21805, B. Pipoly 6954, C. Pipoly 6539, D. Liesner 8038, E. Luteyn 9032, F. Steyermark 100867, G. Mason 13730, H. Pipoly 6975, I. Pearce 250, J. Lebmann 599, K. Luteyn 10175. Figure from Pipoly, 1987, drawn by Bobbi Angell.

28. *Cybianthus marginatus* (Benth.) Pipoly, (Fig. 1A,B, 7C,F, 21). Mem. New York Bot. Gard. 43:60. 1987. *Grammadenia marginata* Benth., Pl. Hartw. 218, 1846. TYPE: COLOMBIA. CAUCA: Near Pirayo, 3,636 m, 18°43' (bisex. fl), C. Hartweg 1200 (HOLOTYPE: K; ISOTYPES: BM, E, G-BOISS, G-DEL, LD, OXF, P, W-2 sheets).

*Grammadenia lehmannii* Mez in Engl., Pflanzenr. IV. 236(Heft 9): 231. 1902. TYPE: COLOMBIA. TOLIMA: Altos de Otesas, 3,300 m, 11 Jan 1883, (bisex. fl), F. Lebmann 2399 (LECTOTYPE by Pipoly 1987: G; ISOLECTOTYPES: LE, US).

*Grammadenia alpina* Mez in Engl., Pflanzenr. IV. 236(Heft 9):231. 1902. TYPE: VENEZUELA. Andes of Trujillo and Mérida, 1,212–4,390 m, 1842 (bisex. fl), J. Linden 447 (LECTOTYPE by Pipoly 1987: P; ISOLECTOTYPES: BM-2 sheets, BR, G, G-DEL, G-BOISS, K, OXF, S, VEN).

*Grammadenia pastensis* Mez in Engl., Pflanzenr. IV. 236(Heft 9):232. 1902. TYPE: COLOMBIA. NARIÑO: W cordillera of Pasto, 3,000–3,200 m, 20 Feb 1881 (bisex. fl), F. Lehmann 599 (HOLOTYPE: G; ISOTYPES: BM, LE).

*Grammadenia nitida* Mez in Engl., Pflanzenr. IV. 236(Heft 9):232. 1902. TYPE: PERU. HUÁNUCO: Pozuzo, 2,131–2,727 m, 1863 (bisex. fl, fr), R. Pearce 250 (HOLOTYPE: K).

*Grammadenia weberbaueri* Mez, Repert. Spec. Nov. Regni Veg. 16:418. 1920. TYPE: PERU. CAJAMARCA: Jaén, cordillera E of Huancabamba, E slopes, 2,400–2,500 m, Apr 1912 (bisex. fl), A. Weberbauer 6121 (LECTOTYPE by Pipoly 1987: GH; ISOLECTOTYPE: F).

*Grammadenia hexamera* Pittier, J. Wash. Acad. Sci. 21:140. 1931. TYPE: VENEZUELA. MÉRIDA: Tabay, 2,500–3,000 m, 18 Sep 1930 (bisex. fl), W. Gebriger 471 (HOLOTYPE: VEN; ISOTYPES: A, F, G, NY, PH).

*Grammadenia andicola* Cuatrec., Revista Acad. Colomb. Ci. Exact. 8(31):321. 1951. TYPE: COLOMBIA. VALLE: Cordillera Occidental, Los Farallones, NW slope, Quebrada Las Nieves, below El Diamante, 2,900 m, 30 Jul 1946 (bisex. fl, fr), J. Cuatrecasas 21805 (LECTOTYPE by Pipoly 1987: F; ISOLECTOTYPES: F, COL 2-sheets, U, US).

Epiphytic shrub or small tree to 6 m, the trunk leptocaulous. Branchlets prominently ridged, 3–4(–5) mm diam., verruculose- to verrucose-papillate, rugose when dried, glabrous. Leaves coriaceous, symmetrical, oblong, elliptic or lanceolate, (3–)3.5–6(–6.5) cm long, (1.1–)1.4–2(–2.5) cm wide, apically acute to obtuse, mucronulate, basally acute, auriculate, nitid above, pallid below, prominently punctate and punctate-lineate, the margin entire, revolute. Inflorescence erect, the rachis flexuous, slender, (1–)1.3–2(–3.2) cm long, densely black punctate-lineate; floral bracts widely ovate to deltate, (0.8–)1.2–1.5(–1.8) mm long, 0.8–1.4(–1.8) mm wide, apically acute, the margin entire; pedicels (1–)1.5–2 mm long. Flowers coriaceous, 5(–7)-merous; calyx 1.1–2.1 mm long, the tube ca. 0.1 mm long, the lobes deltate, (1–)1.5–2 mm long, (1.2–)1.3–1.5(–2) mm long, apically acute, prominently and densely punctate and punctate-lineate, the margins minutely crenulate, glabrous to minutely ciliolate at first apically; corolla (2–)2.2–3 mm long, the lobes widely ovate, (1–)1.2–2 mm long, (1.2–)1.5–2(–2.5) mm wide, obtuse to rounded, glabrous without, glandular-granulose within basally, densely and prominently punctate medially, the margin entire; staminal tube carnose, 0.6–0.8(–1) mm long, the anthers sessile, alternate with fleshy lobes to 0.2 mm long, quadrate, 0.4–0.7 mm long and wide, apically rounded, basally truncate, the connective prominently punctate dorsally; pistil obnapiform, (0.9–)1.2–1.5 mm long and (0.8–)1.2–1.6 mm diam., the ovary (0.4–)0.6–1 mm long, glabrous to sparingly translucent glandular-lepidote, ovules 2(–4), uni- or biseriate, the style 0.3–0.5 mm long, epunctate. Fruit somewhat ovoid, then ellipsoid at maturity, 4.5–5(–6) mm long, (2.5–)3–4 mm diam., white, then purple-black at maturity, the punctations red-black, prominent.

*Distribution.*—*Cybianthus marginatus* is the most common species of the

subgenus, occurring throughout the Andes from Venezuela to Peru, 2,000–3,400 m.

*Ecology and conservation status.*—This species occurs in large populations on rocks above lagunas in páramos in northern Ecuador and along watercourses in paramoid elfin forests, and “ceja” formations in the remainder of Ecuador and Peru. As long as there are remnant páramo formations, or elfin forests, there will be populations of *Cybianthus marginatus*. However, in some instances, soil compaction due to overgrazing by sheep can render the soil uninhabitable for this species.

*Etymology.*—The specific epithet refers to the scarious leaf margin, made conspicuous by the coriaceous texture. In addition, this aspect is made more conspicuous by the prominent submarginal vein of many populations.

Representative specimens examined. ECUADOR. Azuay: “Oriente” border, Páramo del Castillo, crest of E cordillera on trail between Sevilla de Oro and Méndez, 2,727–3,333 m, 18 Aug 1945 (fl, fr), W. Camp E-4809 (NY, VEN); Río Collay, Huagarancha S of El Pan, 2,650–3,290 m, 6 Jul 1943 (fl), J. Steyermark 53354 (NY). carchi: Peak of Cerro Golondrinas, 00° 51' 12" N, 78° 08' 21" W, 3070 m, 24 Jul 1994 (fr), B. Boyle et al. 3373 (BRIT, MO, QCNE); Cantón Montufar, Loma El Corazón, Bretaña, SE of Mariscal Sucre, Río Minas, 00° 35' N, 77° 42' W, 3,150 m, 22–23 Dec 1992 (fl, fr), W. Palacios & G. Tipaz 10569 (BRIT, MO, QCNE). Imbabura: Cordillera Oriental, Camp Arelán, E of Volcán Cayambe, 2,803 m, 21 Jul 1944 (fl, fr), W. Drew E-351 (MSC); Ridge just S of Río Clavadero, along trail to Río San Pedro, E of Cayambe, 2,893 m, 27 Jul 1944 (fl, fr), I. Wiggins 10484 (DS, US). Loja: Saraguro-Loja, Km 12.4, turnoff toward Fierro Urco, Km 2.5–2.7, 03° 41' 05" S, 79° 17' 20" W, 3,150–3,300 m, 7 Dec 1994 (fl), P. Jørgensen et al. 1278 (BRIT, LOJA, MO, QCA, QCNE); Páramos de Saraguro, 10 km S of Saraguro, 3,050 m, 2 Jan 1979 (fl), J. Luteyn et al. 6647 (NY, QCA). Zamora-Chinchipe: border, crest of Cordillera Oriental, 2,840 m, 28 Jan 1984 (fl), J. Luteyn & E. Cotton 11295 (NY, QCA); W slopes of Cordillera del Cóndor and NW slopes of Nudo de Sabanillas, around Tambo Cachiayacu, ca. 2 km SE of Yangana, 2,000–3,000 m, 19 Oct 1943 (fl, fr), J. Steyermark 54800 (NY, U); S of El Playón de San Francisco, slopes of Cerro Mirador, 3,300–3,600 m, 29 Dec 1980 (fl, fr), L. Holm-Nielsen et al. 2949 (AAU), J. Jarmillo et al. 3929 (AAU, QCA). PERU. Amazonas: Prov. Luyas, Drto. Camporredondo, Anexo Tullanaya, Cerro Wicsocunga, 06° 05' 35" S, 78° 19' 56" W, 3,075 m, 7 Dec 1996 (pist. fl), J. & L. Campos 3121 (BRIT, MO, USM). Cajamarca: Jaén, SW of Querocorillo, 3,150 m, Aug 1915 (bisex. fl, fr), A. Weberbauer 7168 (F, G, GH). Cusco: La Convención, 2,800 m, 9 Jul 1968 (bisex. fl, fr), T. Dudley 10910 (NA), 10 Jul 1968 (bisex. fl, fr), T. Dudley 10922 (F, NA), T. Dudley 10931B (F, NA). Huánuco: Prov. Huánuco, 45 km on rd. from Huánuco to Tingo María, trail on S side of Carpish Tunnel, 09° 42' S, 76° 05' W, 2,400 m, 3 Mar 1985 (bisex. fl), C. Todzia & B. Stein 2740 (F, TEX, USM).

As was stated previously (Pipoly 1987), *Cybianthus marginatus* is most closely related to *C. lineatus* (Benth.) Pipoly, previously known only from the contiguous Guayana Floristic Province, because of its (synapomorphic) flexuous inflorescences and biseriate ovules. However, *Cybianthus marginatus* is easily distinguished from *C. lineatus* by its glabrous, ridged, verrucose-papillate branchlets, oblong, elliptic or ovate leaves, obnapiform pistil and

ellipsoid fruits. The verrucose-papillate branchlets, leaf and fruit shape are unique (autapomorphic) features within the subgenus.

*Cybianthus marginatus* is the most variable species of the subgenus, containing one-third of the names attributed to *Grammadenia* as taxonomic synonyms. Variation in leaf size and punctuation and quantitative floral variation have led to much overdescription. A full discussion of synonymy and variation was provided by Pipoly (1987). *Cybianthus marginatus* is most closely related to *C. lineatus* by virtue of its flexuous inflorescences and biseriate ovules. However, *Cybianthus marginatus* is easily distinguished from *C. lineatus* by the glabrous, ridged, verrucose-papillate branchlets, oblong, elliptic or ovate leaves, obovate-pistil and ellipsoid fruits.

29. *Cybianthus lineatus* (Benth.) Pipoly (Fig. 7E), Mem. New York Bot.

Gard. 43:64. 1987. *Grammadenia lineata* Bentham, Pl. Hartw. 218. 1846. TYPE: VENEZUELA. ["GUYANA"]. BOLÍVAR: Savannas near Roraima, 1843 (bisex. fl, fr), R. Schomburgk 647/992 (HOLOTYPE: K; ISOTYPES: B, BM, G-DC, G-DEL, P, U, W-2 sheets).

Terrestrial shrub to 1.5 m tall, the trunk pachycaulous. Branchlets terete, (2.5-)3-4(-6) mm diam., densely red glandular-papillate apically. Leaves coriaceous, symmetrical, oblanceolate, (1.2-)1.6-3(-3.9) cm long, (0.4-)0.6-1(-1.2) cm wide, apically acute, basally subauriculate, the margin flat. Inflorescence erect, flexuous, at times reduced to a simple dichasium, 0.6-1.0(-2.5) cm long, sparingly glandular-papillate; floral bracts widely ovate, 0.8-1.1 mm long, 1.1-1.4 mm wide, apically acute, the margin entire, glabrous. Flowers chartaceous, 5-6(-7)-merous; calyx 1.1-1.6 mm long, the tube ca. 0.1 mm long, the lobes wide-triangular to deltate, (0.8-)1-1.5 mm long, (0.7-)1-1.2(-1.4) mm wide, apically acute, conspicuously black punctate and punctate-lineate, the margins entire, glandular-ciliolate; corolla (1.8-)2-2.5(-3) mm long, the lobes widely ovate, (1-)1.3-1.6(-2) mm long, (1-)1.3-1.7(-2) mm wide, obtuse to emarginate, inconspicuously punctate medially, the margins irregular, entire; staminal tube carnose, conspicuous, (0.6-)0.8-1 mm long, the anthers sessile, alternate with prominent fleshy lobes, quadrate, 0.4-0.6 mm long and wide, apically rounded, prominently black punctate dorsally; pistil ellipsoid, (0.9-)1-1.2(-1.4) mm long, (0.8-)1-1.3 mm diam., the ovary 0.8-1 mm long, glabrous to translucent glandular-lepidote apically, ovules 2-3, when more than 2, biseriate, the style (0.1-)0.2(-0.3) mm long, glabrous. Fruit obovoid, (3-)4-5 mm long, (2-)2.5-3 mm diam., purple, then black at maturity, the punctations green, prominent.

*Distribution*.—Formerly thought to be endemic to the Guayana High-land, in open savannas on tepui summits throughout Pantepui (Mayr & Phelps 1967), at 1,400-2,850 m elevation, but now known elsewhere only from the collection cited below.

*Ecology and conservation status*.—*Cybianthus lineatus* grows in fully exposed,

dry montane "shrub savannas" (Huber 1995) in shallow sand over sandstone throughout Pantepuá. Its occurrence in Pajonal ("jalca") vegetation in Peru gives reason to expect it in other places, especially in the Cordillera del Cóndor along the Ecuadorean/Peruvian border. Unfortunately, recent civil unrest has prohibited collection in that area. In the majority of the range for the species, *Cybianthus lineatus* is not threatened.

**Etymology.**—The specific epithet refers to the numerous and prominent punctate-lineations of the abaxial leaf surface.

Specimen examined. PERU. Pasco: Oxapampa Prov., Cerro Pajonal, 29 km from Oxapampa, 2,680 m, D. Smith & Foster 2509 (F, MO, USM).

*Cybianthus lineatus* is most closely related to *C. marginatus* (Benth.) Pipoly, by virtue of its flexuous inflorescence and biseriate ovules (Pipoly 1987). However, *Cybianthus lineatus* may be easily recognized by its pachycaulous trunk, densely red glandular-papillate branchlet apices, ellipsoid pistil and obovoid fruits. It is the only species in the subgenus with parenchyma instead of aerenchyma in the cortex, the only one with bifacial palisade layers in the leaf, and the only one with a pachycaulous trunk. None of these morphological peculiarities are unexpected given its drier, wind-swept habitat.

### 30. *Cybianthus magnus* (Mez) Pipoly, Mem. New York Bot. Gard. 43:55. 1987.

Facultative epiphytic shrub or tree to 7 m tall. Branchlets terete, smooth, glabrous. Leaves chartaceous, asymmetrical, narrowly oblanceolate, oblanceolate or narrowly obovate, (4.5–)5.2–15 cm long, (1.0–)2.1–5.2 cm wide, apically acute to abruptly acuminate, tapering abruptly or gradually to base, bearing hydropotes above or not, conspicuously black punctate and punctate-lineate or inconspicuously pellucid to orange punctate below, the margins entire, flat, or subrevolute. Inflorescence lax, straight, (1.5–)2–8(–11.5) cm long, slender, densely glandular-granulose and papillate, prominently black punctate-lineate or conspicuously orange to brown punctate-lineate; floral bracts ovate, widely ovate or deltate, (0.7–)1.1–2.2 mm long, (0.6–)1.3–2 mm wide, apically acute to acuminate, prominently black or orange punctate and punctate-lineate, the margins erose and glandular-ciliate; pedicels 1.0–2.2(–5.5) mm long in flower, the smaller ones accrescent to 4(–6) mm long in fruit. Flowers chartaceous, 5(–6)-merous, whitish-green or pink to maroon; calyx lobes widely ovate to delatake, (0.8–)1–1.5(–2) mm long, (0.8–)1–2.1 mm wide, apically acute to acuminate, prominently black punctate and punctate-lineate or orange to brown punctate, the margins erose to fimbriate and densely glandular-ciliate; corolla (1.7–)2–2.6(–3) mm long, the staminate and bisexual maroon, the pistillate white, the lobes widely ovate, 1.1–1.6(–2.2) mm long, (0.9–)1.1–2.6 mm wide, apically obtuse to emarginate, rugose medially within, densely and prominently black punctate and

punctate-lineate or orange to brown punctate, the margins irregular, entire; staminal tube membranaceous, (0.4–)0.7–1(–1.2) mm long, lobate, the lobes 0.1–0.2 mm long, the anthers sessile, alternate with the lobes, ovate to quadrate, (0.3–)0.4–0.6 mm long, 0.4–0.6(–7) mm wide, apically rounded or emarginate, the connectives epunctate ventrally, prominently black or orange punctate dorsally; pistil obnapiform, 1–1.2 mm long, 0.9–1.5 mm diam., the ovary 0.6–0.9(–1.3) mm long, densely translucent glandular-lepidote, the ovules 2–4(–5), uniseriate, the style 0.3–0.5(–0.7) mm long, glabrous. *Fruit* obovoid, 2.5–3.5 mm long, 2–3 mm diam. when dried, pink, then purple-black or white, then lavender at maturity, prominently black punctate-lineate or orange punctate and punctate-lineate when dried.

*Distribution*.—*Cybianthus magnus* occurs in the Andes of Venezuela southward to Peru as an epiphyte in the cloud forest zone below subpáramo thickets and as a facultative epiphyte in montane and elfin “ceja” forests, from 1,100–3,500 m. It is also known from the Serranía de Turumíqure, in the states of Monagas, Sucre and Anzoátegui, Venezuela, at 2,000–2,400 m.

*Etymology*.—The specific epithet refers both to the large, branchlets, often appearing succulent, as well as the large leaf size found in some populations.

As shown by Pipoly (1987) *Cybianthus magnus* is most closely related to *C. parasiticus* (Sw.) Pipoly from the Lesser Antilles by its chartaceous corolla rugose medially within, asymmetrical leaves, and obovoid fruits, but is easily separated from it by its erose and fimbriate calyx lobes, lobate staminal tube and sessile anthers. *Cybianthus magnus* superficially resembles *C. marginatus* (Benth.) Pipoly, but may be easily separated by its subsucculent smooth stems, and obovoid fruits.

Both subspecies are known from Ecuador and Peru, with one region of apparent sympatry on the eastern slopes of the Cordillera Oriental in Ecuador and adjacent northern Peru. However, they appear to be separated by habitat. In Ecuador and Peru, subspecies *magnus* appears to be restricted to closed cloud forests, while subspecies *asymmetricus* is found in open montane forest and elfin (“ceja”) forest. The salient features of each are summarized below.

30a. *Cybianthus magnus* (Mez) Pipoly subsp. *magnus* (Fig. 8E). Mem. New York Bot. Gard. 43:56. 1987. *Grammadenia magna* Mez in Engl., Pflanzenr. IV. 236(Heft 9):231. 1902. TYPE: COLOMBIA. SANTANDER DEL NORTE: Ocaña to Pamplona, 2,000–2,500 m, 4 Mar 1879 (fl), W. Kalbreyer 1087 (HOLOTYPE: K).

*Grammadenia oxygyna* Cuatrec., Revista Acad. Colomb. Ci. Exact 8:321. 1951. TYPE: COLOMBIA. VALLE DEL CAUCA: Cordillera Occidental, W slope, bank of Río Diguá, left side, Piedra de Moler, 900–1,100 m, 20 Aug 1943 (fl, fr), J. Cuatrecasas 14947 (LECTOTYPE by Pipoly (1987); F, NY Neg 12136; ISOLECTOTYPES: COL-3 sheets, F, U, US).

Facultative epiphytic shrub or tree to 7 m tall, 7–15(–30) cm diam., the

canopy often bowl-shaped. *Branchlets* (4.0–)5.0–7.0 mm diam. *Leaves* not bearing hydropotes above, conspicuously black punctate and punctate-lineate below. *Inflorescence* rachis prominently black punctate and punctate-lineate. *Flowers* with perianth whitish-green, prominently black punctate and punctate-lineate; anthers ovate, rounded apically, the connectives prominently black punctate dorsally. *Fruit* purple-black at maturity, prominently black punctate-lineate when dried.

*Distribution.*—Subspecies *magnus* occurs from the Serranía de Turumíqure (states of Anzoátegui, Monagas, Sucre), and in the Andes, from Venezuela southward through Colombia to and Ecuador to Peru.

*Ecology and conservation status.*—Subspecies *magnus* occurs as an epiphyte in closed cloud forests, especially those below subpáramo thickets. It is a relatively rare, but widely distributed subspecies, and is increasingly endangered owing to habitat destruction.

*Etymology.*—The epithet refers to the leaf size and stem succulence, a novelty within the subgenus.

Specimens examined. ECUADOR. Loja: Between Nudo de Sabanillas and Río Cachiyacu at Tambo Cachiyacu, 3,000–3,500 m, 17 Oct 1943 (fr), J. Steyermark 53584 (NY). Zamora-Chinchipe: Nangarita Cantón, ridge crest of Cordillera del Cóndor, above Pachicutza, on disputed Peru-Ecuador border, 04° 06' S, 78° 35' W, 1,800 m, 5 Dec 1990 (stam. fl), D. Neill & W. Palacios 9518 (MO, QCNE). PERU. Cajamarca: Prov. San Ignacio, path at the border of "La Unión," 2,200 m, 1 Nov 1995 (stam. fl), C. Díaz & A. Torres 7805 (BRIT, MO, USM).

30b. *Cybianthus magnus* (Mez) Pipoly subsp. *asymmetricus* (Mez) Pipoly (Fig. 8F), Mem. New York Bot. Gard. 43:57. 1987. *Grammadenia asymmetrica* Mez, Bull. Herb. Boissier sér 2, 5:246. 1905. TYPE: PERU. LORETO: Cerro de Ponasa, 1,300 m, Mar 1903 (fr), E. Ule 6792 (LECTOTYPE by Pipoly 1987: HBG; ISOLECTOTYPES: F, G, K, L).

*Grammadenia macrocarpa* Lundell, Wrightia 5:292. 1976. TYPE: ECUADOR. NAPO: 17 km W of Lumbaque, 70–73 km W of Lago Agrio, 1,130 m, 4 Nov 1974 (bisex. fl, fr), A. Gentry 12419 (HOLOTYPE: LL-TEX; ISOTYPES: MO, S).

Facultative epiphytic shrub to 2 m tall, 7 m diam., the canopy open, conical. *Branchlets* 2.5–3.5(–4.0) mm diam. *Leaves* bearing hydropotes above at least proximally, inconspicuously pellucid to orange punctate below. *Inflorescence* rachis conspicuously orange to brown punctate-lineate. *Flowers* with calyx greenish-pink, the staminate and bisexual with corolla maroon, the pistillate with corolla white and prominently orange punctate and punctate-lineate lobes; anthers quadrate, apically emarginate, the connectives prominently orange punctate dorsally. *Fruit* white, then lavender at maturity, prominently orange punctate and punctate-lineate when dried.

*Distribution.*—*Cybianthus magnus* subsp. *asymmetricus* occurs as an obligate epiphyte, growing on detritis in open montane forests and elfin forests, from the Darién of Panama to Cusco, Peru, from 1,000–2,000(–2,700) m.

*Ecology and conservation status.*—Subspecies *asymmetricus* grows as an obligate epiphyte, growing on rocks with deep organic detritis and large, moss-covered trees. With increasing levels of disturbance, it is being threatened.

*Etymology.*—The epithet refers to the asymmetric shape of the leaf blades.

Specimens examined. ECUADOR. Carchi: Cantón Tulcán, Parroquia Tobar Donoso, Reserva Indígena Awá, Centro El Baboso, 00° 53' N, 78° 25' W, 1,800 m, 17–27 Aug 1992 (fr), G. Tipaz et al. 1741 (BRIT, MO, QCNE); Parroquia el Chicál, Centro San Marcos, 01° 06' N, 78° 14' W, 900–1,100 m, 20–30 Apr 1993 (fl), P. Méndez et al. 341 (BRIT, MO); Cerro Golondrinas, valley bottom ca. 1.5 km NNE of summit, 00° 51' 52" N, 78° 08' 10" W, 2,750 m, 25 Jul 1994 (stam. fl), B. Boyle et al. 3450 (BRIT, QCNE, MO). PERU. Amazonas: Prov. Bagua, Imaza, Nuevo Samaria (anexo de UVT), 18 Mar 1995 C. Díaz et al. 7585 (BRIT, HUT, MO, USM). Cusco: La Convención, Cordillera Vilcabamba, ca. 1/2 way between Camps 2 1/2 and 3, 1,980 m, 1 Jul 1968 (bisex. fl, fr), T. Dudley 10668 (F, NA), 1,800 m, 24 Jul 1968 (bisex. fl, fr), T. Dudley 11324 (NA). Huánuco: Prov. Pachitea, region of Pucallpa, W part of Sirá Mountains and adjacent lowland, ca 24 km SE to 26 km ESE of Puerto Inca, next to Campamento Pato Rojo, 09° 27' S, 74° 46' W, and along crest after Campamento Peligroso I, 600 m, 14 Apr 1988 (fr), B. Wallnöfer 18–14488 (BRIT, MO, W, WU). Pasco: Oxapampa, Cordillera Yanachaga, Cerro Pajonal, chacos, 12 km SE of Oxapampa, 2,700–2,800 m, 7 Oct 1983 (bisex. fl), R. Foster 9013 (MO, NY, USM).

*Cybianthus magnus* subsp. *asymmetricus* is notable for its stems with angular collenchyma in the pith, well-developed aerenchyma in the inner cortex, and tangential collenchyma in the outer cortex. It is separated from subspecies *magnus* by its inconspicuous or orange punctate leaves, orange punctate-lineate inflorescence rachis and perianth, quadrate, emarginate anthers and open montane and elfin forest habitat.

*Grammadenia macrocarpa* Lundell is notable only for its large, bright orange fruits and smaller flowers. I examined one fruit from each of the isotypes of *G. macrocarpa* and found an insect larva in each one, accounting for the size and peculiar morphology.

VIII. *Cybianthus* Mart. subgenus *Cybianthus*. *Cybianthus* sect. *Eucybianthus* Miq. in Mart., Fl. Bras. 10:292. 1856. *Cybianthus* sect. *Cybianthoides* Miq. in Mart. Fl. Bras. 10:292. 1856. TYPE SPECIES. *Cybianthus penduliflorus* Mart.

*Peckia* Vell., Fl. Flum. 1:51. 1825., nom. rej.

Terrestrial dioecious shrubs or small trees. Roots positively geotropic. Bark mostly smooth, gray or sometimes brown, cracking longitudinally on older parts. Trunks distinguishable, normally more or less terete, leptocaulous, growth dynamics corresponding to Rauh's Model (Hallé et al. 1978). Branchlets thin to moderately thick, terete, trigonal, or ridged, rufous stellate or dendroid tomentose or rarely, with rufous, subsessile covering lepidote scales. Cataphylls and pseudocataphylls absent. Leaves alternate, or pseudoverticillate, supervolute, exstipulate, petiolate; blades epunctate or variously black or red punctate, the punctations at times prominent. Inflorescence a simple, lateral (axillary) raceme; peduncle 1–5 mm long, the rachis straight, minutely

rufous glandular-papillate, glandular-granulose or lepidote, glabrescent or persistent; floral bracts solitary, at pedicel basally, ovate to lanceolate, persistent; pedicels cylindrical to clavate, or obconic, minutely glandular-papillate, glandular-granulose or lepidote, accrescent in fruit. *Flowers* unisexual or bisexual, 4-merous; perianth lobes imbricate or rarely valvate, prominently, conspicuously or inconspicuously punctate and/or punctate-lineate; calyx cotyliform, the lobes erect, at times reflexed in fruit, the margins irregular or regular, entire or minutely crenulate, glandular-ciliate; corolla rotate, to subrotate, the tube short, glabrous or glandular-granulose, at times papillate, the lobes glabrous without, glandular-granulose and/or glandular-papillate throughout within, the margins regular or irregular, entire or minutely crenulate, glabrous, glandular-granulose or papillate along the margins; stamens and staminodes similar, developmentally adnate to the corolla tube to form an inconspicuous tube, the stamens thus appearing epipetalous, apical free portion of the filaments present or absent, when present up to 3 times longer than the anthers, the anthers basifixated, appearing sessile or on minute apically free filaments, quadrate or ovate, apically emarginate, rounded, acute, apiculate or truncate, basally truncate or subcordate, dehiscent by apical pores, the pores at times confluent, the connective epunctate or conspicuously or prominently punctate, at times glandular-papillate; pistil and pistillode similar, conic, ellipsoid, or rarely, obturbinate, the ovary terete, lobed or costate, sparsely to densely translucent-lepidote, the placenta subglobose, (1-)2-3(-4) ovulate, the ovules half-immersed in the basal placenta, uniseriate or biseriate, the style long-attenuate, the stigma punctiform, lobed or capitate-lobed. *Fruit* drupaceous, depressed globose, the exocarp sometimes fleshy, the mesocarp and endocarp stony, prominently punctate-lineate, white, red or purple-black at maturity, one seeded, the testa corrugate, the embryo cylindrical, transverse.

A subgenus of 50 species in tropical South America, with the largest concentration of species in the Amazon Basin and adjacent Guianas, Planalto and coastal Brazil. Subgenus *Cybianthus* is by far the most complicated taxonomic group within the genus and is known from rather incomplete material. Collection of more material is hampered by the fact that the populations studied heretofore have revealed population densities lower than any other subgenus. So far, 13 species are known from Ecuador and Peru, but with additional collections, we may expect to find *Cybianthus lanceolatus* Pax, and/or *Cybianthus psychotriifolius* (Rusby) Mez, both from nearby Bolivia, in southern Peru.

#### KEY TO SPECIES OF CYBIANTHUS SUBGENUS CYBIANTHUS

1. Branchlets subterete to angulate.
2. Inflorescence spicate or subspicate; calyx lobes inconspicuously or prominently orange punctate; petioles pulvinate basally.

3. Leafblades inconspicuously pellucid punctate below; calyx lobes chartaceous or carnose, rounded or acute apically.
4. Branchlets 4–6 mm diam.; leaf blades coriaceous, nitid above; petioles 2.2–3 cm long; inflorescence spicate, the pedicels obsolete to 0.4 mm long; calyx lobes charraceous, deltate, the margin entire, undulate, glabrous. .... 31. *C. incognitus*
4. Branchlets 2–3.9 mm diam.; leaf blades membranaceous, dull above; petioles 1.7–2 cm long; inflorescence subserrate, the pedicels 0.6–0.9 mm long; calyx lobes carnose, ovate, the margin crenulate, glandular-ciliate. .... 32. *C. minutiflorus*
3. Leaf blades perpuncticulose below; calyx lobes membranaceous, subacuminate apically. .... 33. *C. huampamiensis*
2. Inflorescence racemose; calyx lobes densely and prominently black punctate or epunctate; petioles tapered, not pulvinate basally.
5. Leaves alternate; calyx lobes acute apically, the margins hyaline; anthers apically rounded, obtuse or acute apically, the pores not confluent.
6. Pedicels 1.9–2.2 mm long; flowers erect; calyx carnose, 0.8–1.1 mm long, the lobes ovate, abruptly constricted basally, densely and prominently black punctate, the margin irregularly serrate, punctate-lineate, glabrous. .... 34. *C. granulosus*
6. Pedicels 2.5–3.5 mm long; flowers nodding; calyx membranaceous, 1.5–1.9 mm long, the lobes deltate to triangular, not constricted basally, epunctate, the margin entire, epunctate, minutely glandular-ciliolate. .... 35. *C. flavovirens*
5. Leaves pseudoverticillate; calyx lobes rounded apically, the margins opaque; anthers truncate apically, the pores confluent. .... 36. *C. venezuelanus*
1. Branchlets terete.
7. Branchlets thick, (6–)7–10 mm in diameter.
8. Leaf blades subacuminate apically; calyx membranaceous or chartaceous, the lobes acute or acuminate.
9. Leaf blades nitid and perpuncticulose above, 12–13.5 cm wide, the secondary veins prominently raised above and below, basally truncate, auriculate; petioles 0.5–1.4 cm long; pedicels 0.3–0.5 mm long. .... 37. *C. grandezi*
9. Leaf blades sordid and epunctate above, 2.1–5 cm wide, the secondary veins deeply impressed above, prominently raised below, basally cuneate; petioles 2.1–5 cm long; pedicels 0.8–1.4 mm long. .... 38. *C. jenсонii*
8. Leaf blades abruptly acuminate apically; calyx coriaceous, the lobes rounded. .... 39. *C. fosteri*
7. Branchlets thin, 1.5–3.5 mm in diameter.
10. Leafblades apically subacuminate to acuminate; calyx lobes acuminate or attenuate, the margin erose, short glandular-ciliate.
11. Leaf blades charraceous to coriaceous, somewhat to very nitid above and below, the midribs raised above, decurrent to base of petiole; petioles short-pulvinate basally.
12. Leaf blades elliptic, (4)5.5–7(–10.8) cm wide, apically long-acuminate, basally cuneate, the tertiary veins prominently raised, inconspicuously pellucid-punctate below; petioles canaliculate; pedicels cylindrical in fruit. .... 40. *C. resinosus*

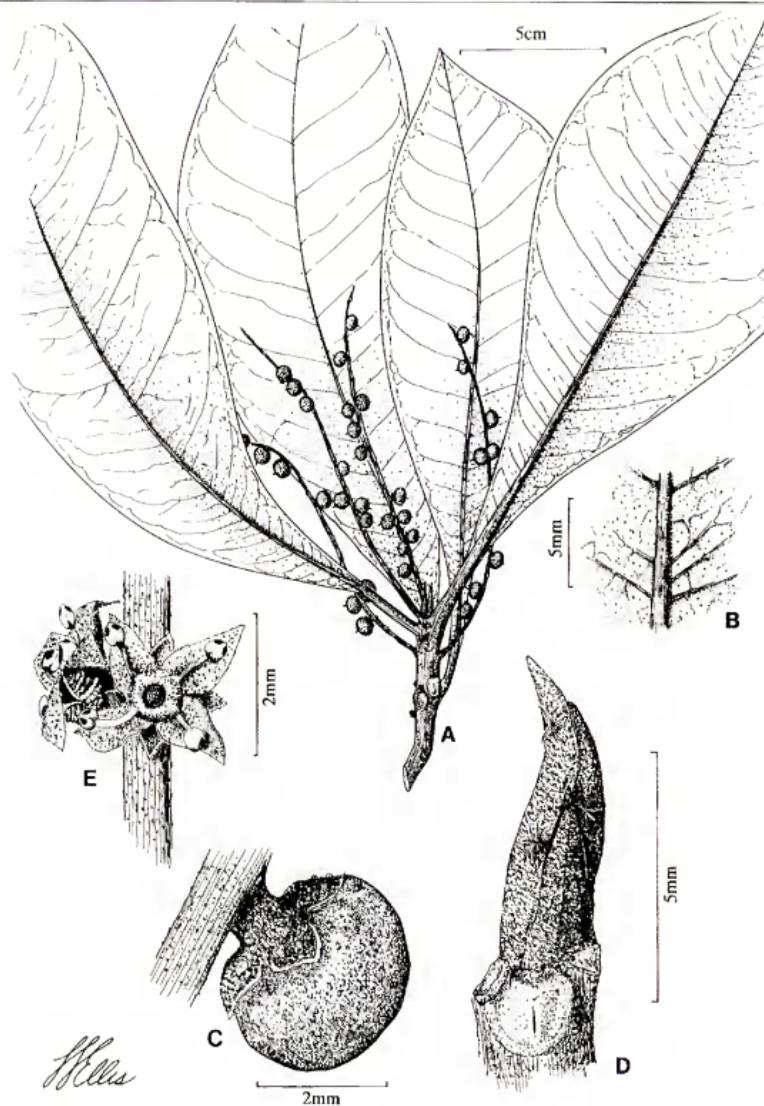


FIG. 22. *Cybianthus incognitus* Pipoly. A. Habit, showing trigonal branchlet. B. Abaxial leaf surface, showing minute scales. C. Portion of infructescence, showing deltate calyx lobes with entire margins. D. Branchlet apex, showing dendroid and stellate tomentum. E. Portion of staminate spike, showing conspicuous staminal tube, and obcordate anthers with subapical non-confluent pores. A, B, D, drawn from Gentry et al. 22911. C, drawn from Barbour 2567. E, drawn from holotype, by Linda Ellis.

12. Leaf blades very narrowly oblanceolate or oblong, 2–4(–5) cm wide, apically and basally long-attenuate, the tertiary veins inconspicuous, conspicuously black or red punctate and punctate lineate below; petioles marginate; pedicels obconic in fruit ..... 41. *C. fuscus*
11. Leaf blades chartaceous, dull green above and below, the midrib impressed above, not decurrent on the petiole; petioles gradually tapering to base, without pulvinus ..... 42. *C. cyclopetalus*
10. Leaf blades apically acute; calyx lobes obtuse, the margin crenulate, long ciliate ..... 43. *C. penduliflorus*
- 31. *Cybianthus incognitus* Pipoly, sp. nov. (Fig. 22).** TYPE: PERU. AMAZONAS: Río Santiago Valley, 03° 50' S, 77° 40' W, Quebrada Caterpiza, 2–3 km from Caterpiza settlement, primary forest, 200 m, tree 9 m tall, 12 Dec 1979 (stam. fl), S. Tunquí 289 (HOLOTYPE: MO; ISOTYPES: USM, NY).
- Ob folia coriacea oblanceolata desuper nitida subter pallida anthera filamenta 3-plo breviores *C. prieuro* valde arcte affinis sed ab ea petiolis canaliculatis (nec marginatis), ramulis adpresse dendroideo- et stellaro- (nec erecte dendroideo-) tomentellis, pedicellis 0–0.4 (non 0.8–1.4) mm longis, lobis calycinis inconspicue pellucido- (non manifeste atro-) punctatis, lobisw corollinis ovatis (nec suborbicularis) pistillodio globoso (nec conico) denique fructu laevi statim recognitnr.

*Tree to 9 m tall, at times flowering precociously (P. Barbour 2405). Branchlets* subterete to trigonal, 4–6 mm diam., appressed rufous dendroid and stellate tomentose. *Leaves pseudoverticillate; blades coriaceous, oblanceolate,* (16–)20–25(–31) cm long, (5–)6.5–8.5(–10) cm wide, apically acuminate, basally cuneate, decurrent on the petiole, nitid above, pallid below, the midrib slightly impressed above, prominently raised below, the secondary veins 9–12(–15) pairs, slightly raised above, prominently raised below, nitid above, pallid and minutely rubiginous lepidote below, the pellucid punctations inconspicuous, the margin entire, irregular, flat; petioles canaliculate 2.2–3 cm long, pulvinate, sparsely pubescent at first, glabrescent. *Staminate inflorescence:* an erect, dense spike, (6–)8–9.5 cm long, the rachis green, sparsely dendroid pubescent, glabrescent; floral bracts lanceolate, 0.5–1 mm long, apically attenuate, sparsely pubescent, early caducous; pedicels obsolete to stoutly cylindrical, 0–0.4 mm long, glabrate. *Staminate flowers* 4-merous, yellow, chartaceous; calyx coryliform, 0.6–0.9 mm long, the tube 0.2 mm long, the lobes deltate, 0.4–0.7 mm long and wide, apically acute, inconspicuously pellucid punctate, the margins scarious, entire, epunctate, undulate, glabrous; corolla subrotate, 1.4–1.6 mm long, the tube 0.2–0.3 mm long, the lobes ovate, 1.2–1.4 mm long, 0.4–0.6 mm wide, apically acute, glabrous without, densely glandular-granulose within, inconspicuously pellucid punctate, the margin opaque, densely glandular-granulose, entire; stamens 1–1.2 mm long, the tube ca. 0.2 mm long, the filaments terete, 0.5–0.6 mm long, slightly reflexed proximally, the anthers obcordate, 0.3–0.4 mm long, apically apiculate, basally cordate, dehiscent by small, subapical, ovate,

non-confluent pores, the pores extending less than 1/2 anther length, the connective epunctate, densely and minutely rubiginous glandular-granulose dorsally; pistillode broadly subglobose, ca. 0.2 mm long, 0.4 mm diam., densely yellow glandular-papillate. *Pistillate inflorescence* as in staminate but 9–12 cm long; floral bracts lanceolate, 0.2–0.5 mm long, glabrate; pedicels obsolete to 0.4 mm long, glabrate. *Pistillate flowers* as in staminate, but calyx 0.6–0.9 mm long, the tube 0.2 mm long, the lobes 0.4–0.7 mm long and wide, the margins opaque, entire; corolla, staminodes and pistil unknown. *Fruit* dark purple at maturity, globose, 0.4–0.5 mm long, 0.4–0.6 mm diam., smooth, inconspicuously pellucid punctate.

*Distribution.*—Upper Río Santiago Valley and adjacent Serranía de Bagua, Amazonas, 200–2,000 m, and Maynas Province, Loreto, Peru, along the Río Napo, at 120 m elevation.

*Ecology and conservation status.*—*Cybianthus incognitus* is mostly a ridgetop species in the cloud forests of Amazonas Department, occurring infrequently near the forest margin. The Upper Río Santiago Valley and adjacent Serranía de Bagua are known for their endemic species (Pipoly 1992b). However, one surprising collection was noted at 120 m elevation, from Caserío de Urcumiraño, in Maynas Province of Loreto Department, where vegetation normally associated with much higher altitudes occurs on the tops of undulating hills. Much more fieldwork will be required to better understand forest dynamics at the western limits of the Peruvian Amazon with the foothills of the Andes.

*Etymology.*—The specific epithet refers to the fact that the plant was misidentified even to family for nearly twenty years, and was finally identified only when a flowering specimen was matched with the other fruiting specimens. The densely spicate infructescences with numerous fruits were heretofore unknown in the genus.

**PARATYPES.** PERU. Amazonas: Prov. Bagua, 12 km E of La Peca, cloud forest, 1700 m, 20 Jun 1978 (fr), P. Barbour 2405 (AMAZ, F, MO, USM), 29 Jun 1978 (fr), P. Barbour 2567 (AMAZ, BRIT, F, MO, NY, US); Ca. 12–18 km E of La Peca in Serranía de Bagua, cloud forest, 1,800–1,950 m, 14 Jun 1978 (fr), A. Gentry et al. 22859 (F, MO, USM), A. Gentry et al. 22911 (F, MO, USM). Loreto: Río Napo near entrance to Isla Inayuga, 20 Sep 1972 (fr), T. Croat 20528 (AMAZ, MO, USM); Caserío de Urcumiraño, Río Napo, 2 hours along trail from village to forest, 120 m, 8 Oct 1979 (stam. fl), C. Díaz & N. Jaramillo 1474 (AMAZ, BRIT, MO, USM).

*Cybianthus incognitus* appears to be most closely related to *Cybianthus prieurii* A. DC. of the Guianas, Venezuela and Brazil, because of the oblanceolate, highly nitid coriaceous leaf blades and the filaments three times longer than the anthers. However, *Cybianthus incognitus* is separated from *C. prieurii* by its canaliculate petioles, dendroid and stellate tomentose branchlets, sessile to subsessile flowers (spicate inflorescences), inconspicuously pellu-

cid-punctate calyx lobes, ovate corolla lobes, globose pistillode and smooth fruits. *Cybianthus incognitus* is unique within the subgenus by virtue of its densely spicate inflorescences, dendroid and stellate tomentum of the branchlets and inconspicuously punctate calyx lobes.

32. *Cybianthus minutiflorus* Mez, Repert. Spec. Nov. Regni Veg. 3:102. 1906. TYPE: PERU, LORETO: near Rioja, W of Moyobamba, 800–900 m, 8 Sep 1904 (pist. fl, fr), A. Weberbauer 4699 (HOLOTYPE: B -destr.; fragment, F; LECTOTYPE, here designated: F). Because the fragment at F contains floral and leaf material, and leave no doubt as to the identity of the species, in the absence of other duplicates, it is most appropriate to select this "clastotype" (a fragment taken with permission) as the lectotype.

*Tree* to 3 m tall. *Branchlets* angulate, 4.5–6 mm diam., densely rufous stellate-tomentose, glabrescent. *Leaves* alternate; blades membranaceous, widely (rarely narrowly) oblanceolate, (14–)19–28(–40) cm long, (4–)9–12(–15) cm wide, apically acuminate, the acumen 1–1.5 cm long, basally cuneate, midrib slightly raised above, prominently raised and densely rufous tomentulose below, the secondary veins (9–)12–21 pairs, slightly raised above, prominently raised and sparsely rufous tomentulose below, smooth and glabrous above at maturity, sparsely rufous puberulent below, conspicuously pellucid punctate, the margin entire, flat; petioles canaliculate, 1.7–2 cm long, somewhat pulvinate, glabrous above, rufous tomentulose below, glabrescent. *Staminate inflorescence* a simple, erect raceme, 4.5–9 cm long, the rachis densely rufous stellate-tomentose; floral bracts linear-lanceolate, 1–1.2 mm long, 0.2–0.3 mm wide, apically attenuate, densely tomentose above and below, the margin entire; pedicels cylindrical, 0.6–0.9 mm long, densely tomentose, persistent. *Staminate flowers* pale yellow; calyx carnose, cotyliform, 0.6–0.8 mm long, the tube ca. 0.1 mm long, the lobes widely triangular, 0.5–0.7 mm long, 0.7–0.9 mm wide, apically acute, densely and prominently orange punctate, sparsely rufous puberulent, the margin irregular, opaque, somewhat crenulate, minutely glandular-ciliolate; corolla carnose, subrotate, 1.2–1.4 mm long, the tube 0.3–0.4 mm long, the lobes widely triangular, 0.9–1.1 mm long, 1.1–1.2 mm wide, apically obtuse, densely and prominently orange punctate medially without, densely glandular-granulose medially and above anther within, the margin opaque, glandular-granulose, entire; stamens apparently sessile at corolla tube apically, the anthers widely obcordate, 0.4–0.5 mm long, 0.7–0.9 mm wide, apically acute, basally cordate, the thecae moderately yellow glandular-granulose, the connective prominently red punctate; pistillode conic, 0.3–0.4 mm long, 0.1–0.2 mm diam., the stigma glandular-papillate. *Pistillate inflorescence* as in staminate but (4–)8–13 cm long; floral bracts 0.6–1 mm long, 0.1–0.2 mm wide, apically attenuate, densely tomentose above and below, the margin entire; pedicels 0.6–0.8 mm long, accrescent in fruit to 1.8 mm long. *Pistillate flowers* as in

staminate but green; calyx 0.8–1 mm long, the tube ca. 0.1 mm long, the lobes 0.7–0.9 mm long, 0.9–1 mm wide; corolla 1–1.2 mm long, the tube 0.2–0.3 mm long, the lobes 0.8–1.0 mm long, 1–1.1 mm wide; staminodes as in stamens but antherodes obcordate, 0.2–0.3 mm long, 0.2–0.3 mm wide; pistil cylindrical, 0.6–1 mm long, 0.2–0.3 mm diam., the ovary angular, 0.3–0.4 mm long, the style 0.3–0.6 mm long, the stigma subcapitate, 4-lobed, the placenta cotyliform, ovules 2, naked. *Fruit* depressed-globose, 2.5–3.5 mm long, 4.5–5.5 mm diam., inconspicuously pellucid punctate, the exocarp thin. *Bisexual inflorescence* in staminate but 2–3(–5) cm long, the rachis moderately tomentose; floral bracts, 0.6–0.9 mm long, 0.1–0.2 mm wide; pedicels 0.6–0.7 mm long. *Bisexual flowers* green; calyx 0.7–8 mm long, the tube ca. 0.1 mm long, the lobes 0.6–0.7 mm long and wide; corolla 1.3–1.4 mm long, the tube 0.2–0.3 mm long, the lobes 1.1–1.2 mm long, 1–1.1 mm wide; stamens identical to pistillate staminodes, but thecae full of pollen; pistil almost indistinguishable from pistillate flower except the stigma subcapitate, 3–4-lobed, ovule 1, naked. *Fruit* (from bisexual flower) unknown.

*Distribution.*—Endemic to the eastern slopes of the Andes and adjacent Amazonian Hylaea of Peru and adjacent Bolivia, 100–1200 m.

*Ecology and conservation status.*—*Cybianthus minutiflorus* occurs in primary tall wet forest and premontane forest, on well drained white sands, known as varillal in Peru. These pockets of sandstone often alternate with rolling lateritic hills in the foothills of the eastern Andean slopes and adjacent Amazonia. The lowland forests where *Cybianthus minutiflorus* occurs are also notable for their numerous lianas. *Cybianthus minutiflorus* is a rare species and should be considered threatened.

*Etymology.*—The specific epithet refers to the extremely small flowers, some of the smallest in the subgenus.

*Local names and uses.*—Peru: “takú kaspi” (Mayna Jívaro); leaves are boiled in water and the decoction drunk to treat stomach ache.

*Specimens examined.* PERU. Amazonas: Prov. Bagua, Dtto. Imaza, Cerros de Putuim, 05° 03' 20" S, 78° 20' 23" W, 350 m, 15 Jun 1996 (stam. fl), R. Vásquez et al. 21187 (AMAZ, MO). Prov. Condorcanqui, Dtto. El Cenepa, NE region of Marañon Drainage Basin, Río Cenepa, Comunidad Tutino, 04° 33' S, 78° 10' W, 750 m, 22 Nov 1993 (fr), R. Vasquez et al. 18520 (BRIT, HUT, MO, USM). Cusco: Quipicanchi Prov., Camantí, Manirí, along Río Manirí and along the trail to Quebrada Garrote, 13° 71' S, 70° 45' W, 720 m, 8 Sep 1990 (bud), M. Timaná 922 (CUZ, MO, USM). Huánuco: Río Llulla Pichí watershed, Cerros del Sirá, 1,290 m, 17 Jul 1969 (fr), J. Wolfe 12346 (E, NA, US). Loreto: Prov. Loreto, Pampa Hermosa and vicinity, Río Corrientes, 1 km S of junction with Río Macusari, 03° 15' S, 75° 50' W, 160 m, 3–20 Dec 1985 (fr), W. Lewis et al. 10312 (BRIT, MO); Prov. Maynas, Dtto. Las Amazonas, Explorapo Camp, near Sucusari, along Río Napo, 03° 20' S, 72° 55' W, 100–140 m, 3 Mar 1991 (ster.), J. Pipoly et al. 14174 (MO, UNAP); Dtto. Iquitos, Allpahuayo (IIAP), Permanent inventory, 04° 10' S, 73° 30' W, 150 m, 25 Mar 1992 (ster.), R. Vásquez et al. 18163 (BRIT, MO, UNAP). Pasco: Oxapampa, Rd. in construction between Oxapampa and Villa Rica, km 7, 10° 37' S, 75° 20' W, 2,100 m, 4 Jan

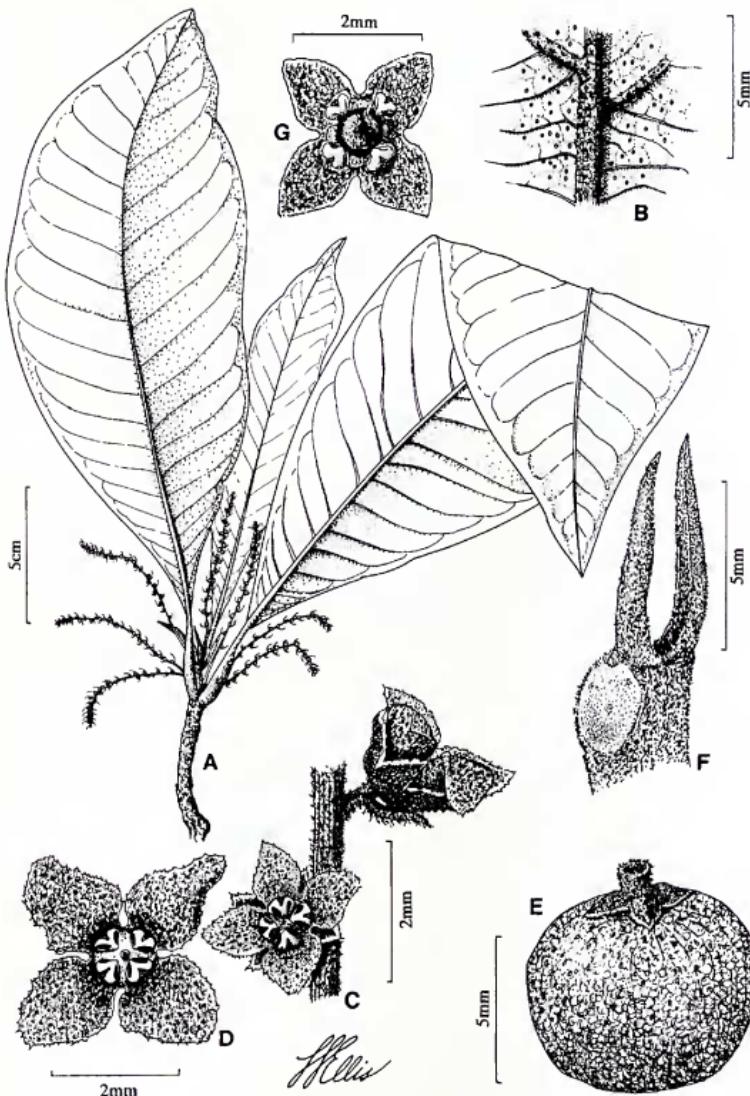


FIG. 23. *Cybianthus huampamiensis* Pipoly. A. Habit, showing pulvinate petioles. B. Abaxial, densely perpunciculose leaf surface. C. Portion of staminate inflorescence, showing subspicate habit, and calyx erose-dentate and glandular-ciliate. D. Staminate flower, showing abruptly constricted corolla lobe base. E. Fruit and calyx. F. Branchlet apex. G. Pistillate flower, showing constricted corolla lobe base. A-B, drawn from *Kayap* 783. C-D, drawn from *Kayap* 982. E-G, drawn from *Kayap* 933. Figure drawn by Linda Ellis.

1984 (bisex. fl), *R. Foster et al.* 7817 (F, MO, USM); Oxapampa, Pichís Valley, San Matías Ridge, 10°–12 km SW of Puerto Bermúdez, above Sta. Rosa de Chivis, trail to Loma Linda, 10° 20' S, 75° 00' W, 1,000 m, 29 Sep 1982 (fr), *R. Foster* 8624 (F, MO, USM), (stam. fl), *R. Foster* 8981 (BRIT, MO, F, NY, US, USM). **San Martín:** Chazuta, Río Huallaga, 260 m, Mar 1935 (stam. fl), *G. Klug* 3981 (F, MO, S, US); Prov. Mariscal Cáceres, Dtto. Tocache Nuevo, Isla de Pucunchu, right bank of Río Huallaga, 3 Apr 1971 (fr), *J. Schunke* 4779 (F, MO, NY, US); W of bridge, 700–800 m, 16 Dec 1971 (fr), *J. Schunke* 5737 (F, NY, MO, US). Ucayali: Prov. Coronel Portillo, Plantación Margarita, near Loreto border, 1,500–1,600 m, 14 Aug 1946 (fr), *R. Ferreyra* 1040 (US, USM). **BOLIVIA.** Pando: Prov. Madre de Dios, Mobil Oil Site, 12° 10' S, 67° 15' W, 170 m, 20–25 Aug 1992 (fr), *T. Killeen* 4449 (BRIT, LPB, MO).

*Cybianthus minutiflorus* is most closely related to *C. granulosus* Pipoly by its densely rufous furfuraceous-lepidote branchlets, erect, carnose, densely and prominently black punctate perianth, and sessile anthers. However, the flat petioles, subacuminate leaf apices, short pedicels, opaque, crenulate and epunctate margins of the calyx lobes, and emarginate anthers easily distinguish *Cybianthus minutiflorus*.

**33. *Cybianthus huampamiensis* Pipoly, sp. nov. (Fig. 23).** TYPE: PERU. AMAZONAS: Quebrada chigkan entsa, Río Cenepa, 300 m, 9 Jun 1973 (stam. fl), *E. Ancuash* 588 (HOLOTYPE: MO; ISOTYPES: NY, USM).

Propter folia elliptica lanceolata vel oblanceolata, longipetiolata equilaterale vel inequilaterale secus margines irregulares, rhachides inflorescentiales graciles, flores erectes deminutosque, necnon frutos minores, ad aspectu primo intuito *C. resinosa* arcte similans sed ab ea laminis membranaceis (non tenuiter coriaceis), utrinque sordidis (nec nitidis) subter manifeste prominentaque atro-perpuncticulosus (nec epunctatis), petiolis (1.5–)2–2.5 (non 0.5–1.4) cm longis, lobis calycinis translucentibus (non opacis) acuminatis (nec rotundatis), lobis corollinis extus glandulari-granulosis (non glabris) acutis vel rotundatis (nec obtusis vel emarginatis) denique fructibus luteis (non atris) permanente distinguitur.

*Tree* to 3(–6) m tall. *Branchlets* subterete to angulate, (3.5–)4–5 mm diam., densely rufous tomentose, glabrescent. *Leaves* pseudoverticillate; blades membranaceous, elliptic lanceolate or rarely, oblanceolate, (12–)16–25(–31) cm long, (5.2–)7–9(–12) cm wide, apically long-acuminate, basally acute, not decurrent on the petiole, dull green above, pallid below, midrib impressed above, prominently raised below, the secondary veins 12–18 pairs, prominently raised below, glabrous above rufous puberulent below along the veins, prominently and densely perpuncticulose below, the margin entire, irregular, flat; petiole slightly canaliculate distally or flat, 2–2.5 mm long, thick and pulvinate, densely rufous puberulent at first, glabrescent. *Staminate inflorescence* a lax, simple, subsessile raceme, (5–)10–(18) cm long, sparsely rufous puberulent; floral bracts linear-lanceolate, 1–1.3 mm long, apically attenuate, densely rufous puberulent abaxially, the margin erose, persistent; pedicels cylindrical 0.8–0.9 mm long, densely rufous pubescent, glabrescent. *Staminate flowers* yellowish to orange; calyx membranaceous, cotyliform, translucent, 1.2–1.4 mm long, the tube ca. 0.2 mm long, the

lobes ovate, 1–1.2 mm long, 0.6–0.8 mm wide, apically sub acuminate, densely and prominently orange punctate, glabrous, the margin hyaline, prominently erose-dentate, sparsely glandular-ciliate; corolla chartaceous, subrotate, 2.0–2.4 mm long, the tube 0.4–0.5 mm long, the lobes ovate, 1.6–1.9 mm long, 1.2–1.4 mm wide, apically acute to rounded, sparsely glandular-granulose without and densely so throughout within, densely and prominently orange punctate, flat, the margin scarious, erose-denticulate and glandular-granulose; anthers apparently sessile at junction of corolla tube and lobe, very widely ovate, 0.4–0.5 mm long, 0.6–0.8 mm wide, apically obtuse to rounded, dehiscent by apical confluent pores extending ca. 2/3 length of anther, the connective epunctate, densely rubiginous glandular-papillate dorsally; pistillode conic, ca. 0.2–0.3 mm long and diam., hollow, glandular-papillate. *Pistillate inflorescence* as in staminate but (5–)7–9(–14) cm long, densely rufous puberulent at first, glabrescent; pedicel 0.4–0.5 mm long. *Pistillate flowers* as in staminate but yellowish to orange; calyx 1–1.2 mm long, the tube ca. 0.2 mm long, the lobes 0.8–1 mm long, 0.4–0.5 mm wide; corolla 1.8–2.2 mm long, the tube 0.3–0.4 mm long, the lobes 1.5–1.7 mm long, 1.1–1.4 mm wide; staminodes as in stamens but antherodes 0.3–0.4 mm long, 0.5–0.6 mm wide, apically rounded to acute; pistil conic, ca. 1.3 mm long, the ovary 0.5–0.6 mm long 0.6–0.8 mm diam., translucent glandular lepidote, the style short, to 0.2 mm long, the stigma 4-lobate, the lobes distally curved, glandular-papillate. *Fruit* yellow, subglobose, 4–6 mm long, 5–8 mm diam. inconspicuously pellucid punctate.

*Distribution.*—Endemic to the Río Marañón, Río Cenepa and Río Santiago drainage basins in the northwest corner of the Department of Amazonas, Peru, 200–550(–1,850) m.

*Ecology and conservation status.*—*Cybianthus huampamiensis* occurs in the foothills of the premontane and lowland wet forest of the most underexplored area of the Peruvian Hylaea/Andean interface. Given that the region is a border area, and therefore, a priority for development, this species should be considered.

*Etymology.*—The epithet describes the place where the many of the collections were made, the Haumpami area of the Río Cenepa Drainage Basin.

**PARATYPES.** PERU. Amazonas: Prov. Bagua; ca. 12–18 trail km E of La Peca, Serranía de Bagua, 1,800–1,950 m, 14 Jun 1978 (fr), A. Gentry et al. 22859 (F, MO, USM); Río Cenepa, Quebrada tujushik entsa, 330 m, 18 Apr 1973 (fr), E. Ancuash 274 (MO, USM); along Río Cenepa, 350 m, 3 May 1973 (fr), E. Ancuash 303 (MO, USM); Río Cenepa, Quebrada Idayua entsa, 400 m, 16 May 1973 (fr), E. Ancuash 392 (BRIT, F, LL-TEX, MO, US, USM); Río Cenepa, Quebrada Wampusik entsa, 5 Aug 1974 (stam. fl.), E. Ancuash 731 (MO-2 sheets, USM); Río Cenepa, Quebrada Cikan Inci, 250–330 m, 1 Jan 1973 (stam. fl.), B. Berlin 779 (MO, USM); 10 km N of Quebrada Huampami, 200–250 m, 24 Jul 1974 (stam. fl.), B. Berlin 1760 (MO, USM); Quebrada Chigkui Shinuki Cenepa, 250 m, 11 Apr 1973 (fr), R. Kayap 618 (MO, USM), 23 May 1973 (stam. fl.), R. Kayap 783 (MO, NY, USM);

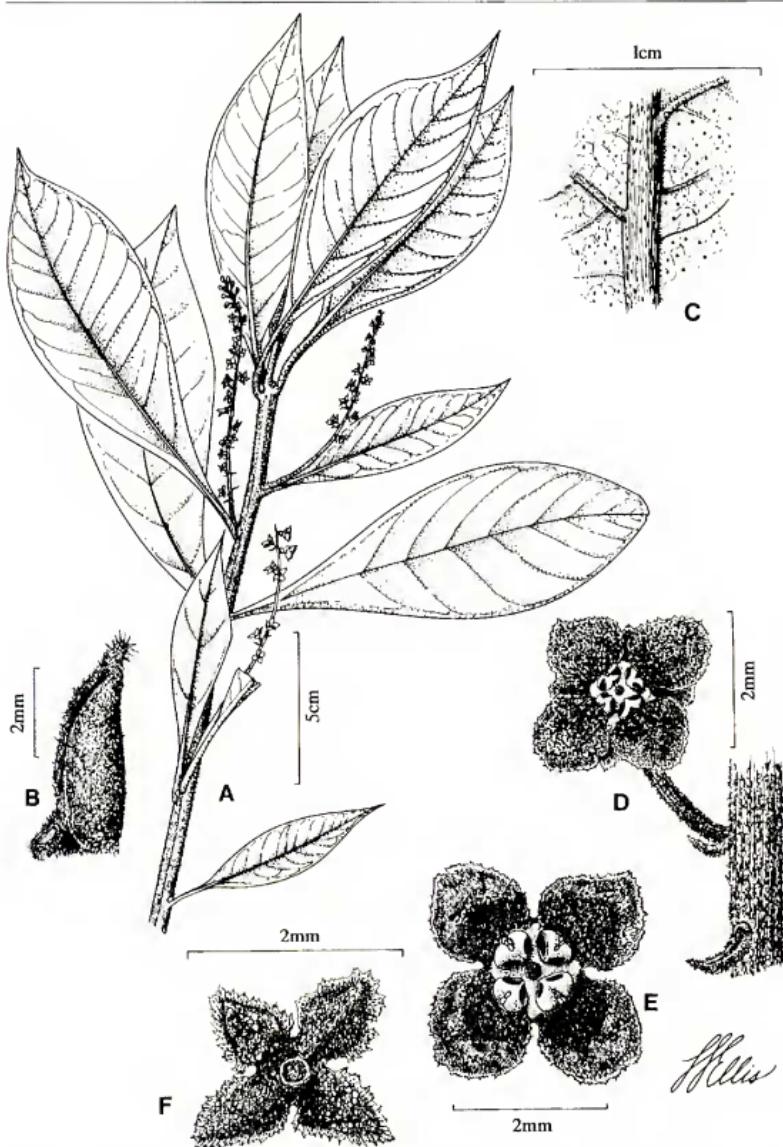


FIG. 24. *Cybianthus granulosus* Pipoly. A. Habit. B. Branchlet apex. C. Abaxial leaf surface, showing minutely rufous lepidote indumentum. D. Staminate flower. E. Staminate corolla. F. Staminate calyx. A-C, drawn from holotype. D-F, drawn from V. Huashikat 1221. Figure drawn by Linda Ellis.

Quebrada Etsekertai, Río Cenepa, 250 m, 31 May 1973 (fr), *R. Kayap* 856 (MO, USM); Quebrada Wampushik entsa, 330 m, 13 Jun 1973 (pist. fl, fr), *R. Kayap* 933 (F, LL-TEX, MO, NY, USM); Huampami, Río Cenepa, 200 m, 15 Jun 1973 (stam. fl), *R. Kayap* 982 (LL-TEX, MO, NY, USM); Río Cenepa, vicinity Huampami, ca. 5 km E of Chávez Valdívía, 04° 30' S, 78° 30' W, 200–250 m, 31 Jul. 1978 (fr), *A. Kujikat* 50 (LL-TEX, MO, NY, USM), 12 Aug. 1978 (fr), *A. Kujikat* 291 (MO, NY, USM), 15 Aug. 1978 (fr), *A. Kujikat* 395 (MO, USM); Mouth of Río Santiago, without date (stam. fl), *G. Tessmann* 4439 (NY); Río Santiago Valley, 03° 50' S, 77° 40' W, Quebrada Caterpiza, 2–3 km from Caterpiza, 200 m, 28 Dec 1979 (stam. fl), *S. Tunquí* 488 (MO, NY, USM); Dto. Imaza, Quebrada Kuzú, 1 hour walk from Comunidad de Cunchim, 370 m, 21 Jul 1994 (fr), *C. Díaz et al.* 6930 (BRIT, HUT, MO, USM); Río Marañon Drainage Basin, Comunidad de Yamayakat, Río Marañon, 04° 55' S, 78° 19' W, 600 m, 28 Jan 1995 (fr), *E. Rodríguez* 283 (BRIT, HUT, MO, USM), Quebrada Kusu-Chapi, 04° 55' S, 78° 19' W, 550 m, Feb 1995 (stam. fl), *R. Vásquez et al.* 20045 (BRIT, HUT, MO), 320 m, 11 Mar 1996 (stam. fl), *N. Jaramillo et al.* 1351 (BRIT, HUT, MO).

*Cybianthus huampamiensis* may at once be distinguished from all other species of the subgenus by its translucent calyx, externally glandular-granulose corolla and yellow fruit. This species is one of many endemic taxa known from this most underexplored area at the junction of the eastern Andean slopes with the Amazon Basin in northern Peru.

34. *Cybianthus granulosus* Pipoly, sp. nov. (Fig. 24). TYPE: PERU. AMAZONAS: Río Santiago Valley, 03° 50' S, 77° 40' W, Quebrada Caterpiza, 2–3 km from Caterpiza settlement, primary forest, 200 m, treelet 2 m tall, fls. brownish-green, 28 Nov 1979 (stam. fl), *S. Tunquí* 161 (HOLOTYPE: MO; ISOTYPE: NY).

Quoad folia alterna chartacea ad apices acuminata ad bases cuneataque, ramulos dense rufo-furfuraceo-lepidotos, flores erectos, carnosos, dense manifesteque atro macularos, antheras sessiles, ad *C. minutifloro* valde affinis sed ab ea petiolis canaliculatis (non planis) laminis abrupte largo-(non sub-) acuminatis, pedicellis 1.5–2.5 (nec 0.5–1) mm longis, lobis calycinis secus margines hyalinis (non opacis) serratis (nec crenulatis) punctato-lineatis (nec epuncinatis) lobis corollinis secus marginis erosionis (nec integerrimis) antheris acutis (nec emarginatis) facile cognoscitur.

Treelet to 3 m tall. Branchlets angulate, 2–4 mm diam., densely rufous furfuraceous lepidote. Leaves alternate; blades chartaceous, elliptic to narrowly oblanceolate, (9–)11–15(–18) cm long, (3–)4–5(–6) cm wide, apically abruptly acuminate, basally cuneate, densely rufous lepidote (appearing granulose) above and below at first, glabrate above, somewhat persistent below, midrib impressed above, prominently raised below, the secondary veins 8–12 pairs, impressed above, prominently raised below, inconspicuously pellucid punctate, the margin entire; petioles canaliculate, 1.5–1.8 cm long, glabrescent above, densely lepidote below. Staminate inflorescence a simple raceme, (4–) 6–9(–10) cm long, the rachis and pedicels densely rufous furfuraceous lepidote; floral bracts carnose, linear lanceolate, 0.8–1.2 mm long, apically long-attenuate, the margin entire, densely lepidote; pedicels cylindrical, 1.9–2.2 mm long. Staminate flowers erect, 4-merous, carnose, subrotate, brownish-green;

calyx 0.8–1.1 mm long, the tube 0.1–0.2 mm long, the lobes ovate, 0.7–0.9 mm long, 0.8–0.8 mm wide, apically acute, abruptly constricted basally, densely and prominently black punctate, moderately rufous lepidote, glabrescent, the margin hyaline, conspicuously black punctate-lineate, irregularly serrate, glabrous; corolla subrotate, 1.6–1.8 mm long, the tube 0.3–0.4 mm long, square, glabrous, the lobes suborbicular, 1.3–1.4 mm long and wide, emarginate apically, abruptly constricted basally, densely and prominently black punctate, sparsely rufous lepidote without, glabrescent, densely glandular-granulose throughout within, the margin erose; anthers sessile at apex of corolla tube, thus appearing epipetalous, the tube 0.3–0.4 mm long, glabrous, the anthers widely quadrate, 0.3–0.4 mm long, 0.6–0.7 mm wide, apically acute, basally truncate, dehiscent by large subapical, ovate pores, the pores not confluent, extending ca. 3/4 anther length, the connectives densely and prominently red or black punctate; pistillode conic, 0.2–0.3 mm long, sparsely glandular-lepidote. *Pistillate inflorescence* unknown. *Fruit* unknown.

*Distribution.*—Endemic to the upper Río Santiago Valley, in the Department of Amazonas, Peru, 180–200 m.

*Ecology and conservation status.*—*Cybianthus granulosus* inhabits wet premontane forests above the Río Santiago valley, which together with the Río Cenepa, comprise a region now known to be host to a number of endemic species. Given that it is most likely endemic, and not at all well-known, its conservation status cannot be determined at this time.

*Etymology.*—The specific epithet refers to the densely rufous lepidote tomentum, which appears granulose when examined superficially.

**PARATYPES.** PERU. Amazonas: Prov. Bagua, Dtto. Imaza, Comunidad Aguaruna Putuim, Anexo Yarnayakat, Zonas Altas de Putuim, "Campou," 700 m, 18 Jan 1996 (fr), C. Díaz et al. 7649A (BRIT, HUT, MO, USM); Río Santiago, 3 km from Caterpiza, 180 m, 12 Nov 1979 (stam. fl), V. Huashikat 1221 (MO, USM); Valle del Río Santiago, 65 km N of Pinglo, Quebrada Caterpiza, 2–3 km from Caterpiza, 200 m, 19 Sep 1977 (bud), V. Huashikat 677 (MO, USM), 28 Nov 1979 (stam. fl), V. Huashikat 1422 (MO, USM).

*Cybianthus granulosus* is most closely related to *C. minutiflorus* Mez by virtue of its alternate, chartaceous leaf blades with acuminate apices and cuneate bases, densely rufous furfuraceous-lepididote branchles, flowers with carnose texture, densely and prominently black punctate, and sessile anthers. However, *Cybianthus granulosus* is easily separated from *C. minutiflorus* by the abruptly long-acuminate leaf apices, canaliculate petioles, the hyaline, serrate, and punctate-lineate calyx margins, the erose corolla margins, acute anthers, and pedicels 1.5–2.5 mm long.

**35. *Cybianthus flavovirens* Pipoly, sp. nov. (Fig. 25). TYPE: PERU. SAN MARTÍN: Prov. Mariscal Cáceres, Dtto. Tocaché Nuevo, Palo Blanco near Fundo de Manuel**

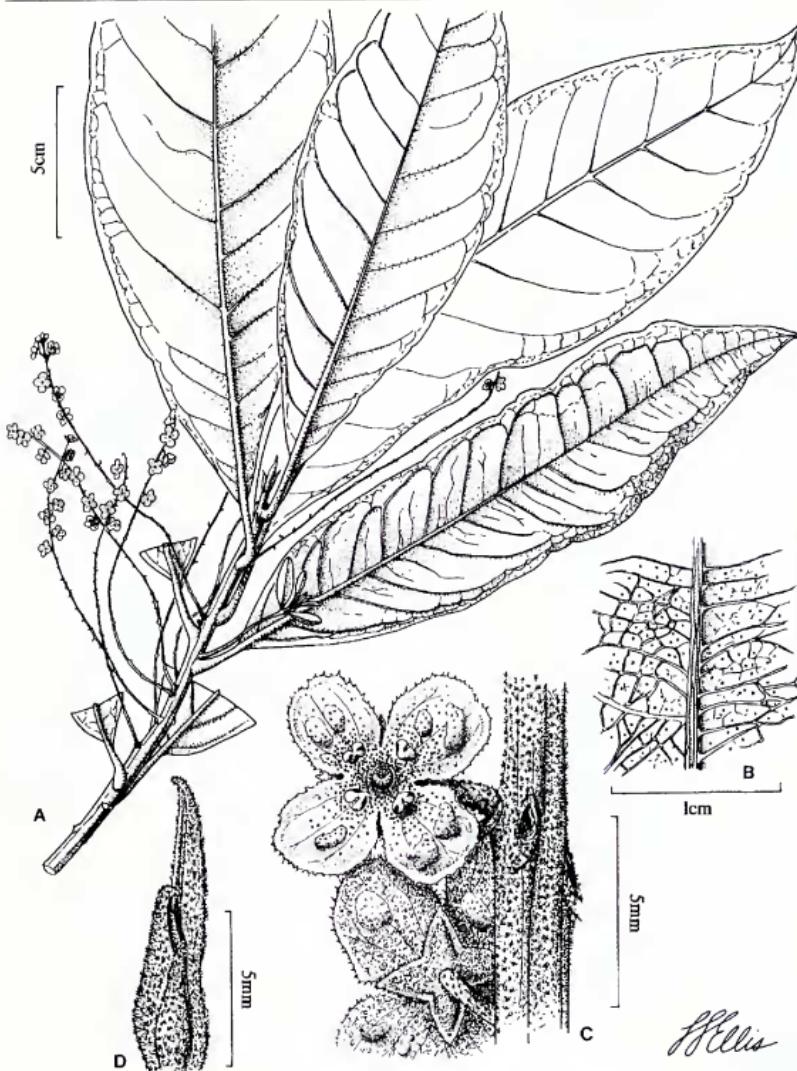


FIG. 25. *Cybianthus flavovirens* Pipoly. A. Habit, showing angulate branchlets and gradually tapering petioles. B. Abaxial leaf surface, showing sparse, rufous stellate tomentum. C. Section of inflorescence, showing nodding flowers, widely deltate calyx lobes and corolla with lobes constricted basally, prominent veins, and pusticulare surface. D. Branchlet, showing rufous stellate tomentum. A–D, drawn from holotype, by Linda Ellis.

Aranjo, 700–800 m, 1 Mar 1979 (stam. fl.), J. Schunke 10883 (HOLOTYPE: MO; ISOTYPES: AMAZ, BRIT, F, TEX, US, USM).

Propter ramulos angulatos, petiolos gradate angustatos, inflorescentiam racemosam, flores nutantes, antheras sessilia, *C. venezuelano* valde arcte affinis, sed ab ea lobis calycinis membranaceis (non carnosis) acutis (nec rorundatis) secus marginis hyalinis (nec opacis), antheris obtusis vel subacutis (non truncatis), porisque separatis (nec confluentibus), denique lobis corollinis membranaceis (non carnosis) pustularis (nec planis) truncatis vel emarginarisque (nec acutisque) praecclare distat.

*Tree to 4 m tall. Branchlets* lightly angulate, 2.5–3.5 mm diam., densely rufous stellate-tomentose. *Leaves* alternate; blades chartaceous, elliptic, (12.5–) 19–30(–32) cm long, (4–)6–10 cm wide, apically subacuminate to acuminate, the acumen 0.5–2 cm long, basally attenuate, decurrent on the distal end of the petiole, midrib somewhat elevated but canaliculate above, not decurrent on petiole, prominently raised and densely rufous tomentose below, the secondary veins 10–16 pairs, dull green above, pallid green below, pellucid punctate above and below, sparsely rufous stellate-puberulent below, the margin entire, opaque, regular, flat; petioles semiterete (1.6–)2–2.5 cm, flat above, tapered, slightly thickened basally, not pulvinate, glabrous above, sparsely rufous pubescent below, glabrescent. *Staminate inflorescence* a lax raceme (7.5–)13–19(–40) cm long, the rachis and pedicels moderately rufous tomentellous, glabrescent; floral bracts linear-lanceolate, 1.1–1.5 mm long, 0.1–0.2 mm wide, apically attenuate, densely rufous tomentellous below, glabrescent, the margin entire; pedicels cylindrical, 2.5–3.5 mm long at anthesis, erect in bud, nodding in anthesis. *Staminate flowers* 4-merous, membranaceous, nodding, bright yellow-green; calyx cotyliform, 1.5–1.9 mm long, the tube 0.6–0.8 mm long, the lobes widely deltate to triangular, 1.1–1.3 mm long and wide, apically acute, epunctate, medially thickened, sparsely rufous puberulent, glabrescent, the margin hyaline, epunctate, entire, minutely glandular-ciliolate; corolla subrotute, 2.8–3 mm long, the tube 0.5–0.8 mm long, glabrous without, densely glandular-granulose within, the lobes suborbicular to oblate, 1.5–2.2 mm long, 2.2–2.6 mm wide, apically truncate to slightly emarginate, contracted basally, translucent, the three veins conspicuous, glabrous without, prominently pustulate and sparsely glandular-granulose above but densely so toward base within, the margin opaque, sparsely glandular-granulose, entire; stamens apparently sessile at junction of corolla lobes and tube, the anthers sessile, very widely ovate-obcordate, 0.4–0.6 mm long, 0.5–0.8 mm wide, apically obtuse to subacute, basally cordate, the pores widely ovate, extending 1/2–3/4 anther length, separate (not confluent), the connective epunctate, minutely red glandular-papillate; pistillode costate, subglobose, 0.8–1 mm long, 0.6–0.7 mm wide, hollow, the stigma capitate, densely yellow glandular-papillate. *Pistillate inflorescence:* unknown. *Fruit* unknown.

*Distribution.*—Endemic to the junction of the westernmost Amazon Basin (Hylaea) with the foothills of the Peruvian Andes, from 100–800 m elevation.

*Ecology and conservation status.*—*Cybianthus flavovirens* occurs in lowland moist forests on *terra firme*. These forests are drier than sites with the same general physiognomy farther to the north in Amazonas and Loreto. The few sporadic collections may be the result of underexploration rather than rarity, but owing to increasing pressure to cut forests for farming, this species should be considered threatened.

*Etymology.*—The epithet refers to the bright yellow-green corolla, a unique feature in the subgenus.

PARATYPES. PERU. Huánuco: Villa Isabel, Río Cuchara, 20 Sep 1961 (stam. fl), J. Schunke 5667 (F, K, MO, US, USM). Loreto: Mishuyacu, near Iquitos, 100 m, Oct–Nov 1929 (stam. fl), G. Klug 285 (F, US), (stam. fl), G. Klug 367 (F, US). Pasco: Prov. Oxapampa, Palcazu Valley, Cabeza de Mono, 5–6 km W of Iscosacfn., 10° 12' S, 75° 14' W, 14–15 Apr 1983 (stam. fl), D. Smith 3709 (MO, US, USM); Prov. Pasco, Palcazu Valley, Selva Central, Cerro de Pasco, Proyecto Especial Pichís–Palcazu, IND, 09° 50' S, 68° 00' W, 300–600 m, 13 Oct 1987 (stam. fl), G. Hartsborn et al. 2996 (BRIT, MO, USM).

*Cybianthus flavovirens* is a member of a complex of taxa related to *C. venezuelanus* Mez, as evidenced by the angulate branches, gradually tapered petioles, nodding flowers, and sessile anthers. However, *C. flavovirens* is easily recognized by its membranaceous perianth, acute calyx lobes with opaque margins, pusticulate, bright yellow-green corolla lobes with truncate or emarginate apices, and obtuse or subacute anthers with separate pores. This species has been confused with *Cybianthus cyclopetalus*. However, *Cybianthus flavovirens* may easily be separated from that species by its angulate branchlets, racemose inflorescences, large, yellow flowers, and deltate to triangular calyx lobes.

### 36. *Cybianthus venezuelanus* Mez in Engl., Pflanzenr. IV, 236(Heft 9):221.

1902. TYPE: VENEZUELA. LARA: Barquisimero, San Felipe, 600 m, Jun 1846 (stam. fl), N. Funck & L. Schlim 678 (LECTOTYPE, here designated: G-BOIS; ISOLECTOTYPES: BM, BR, G, LD, P, W).

*Peckia purpurea* Rusby, Bull. New York Bot. Gard. 4:405. 1907. TYPE: BOLIVIA. Without our locality data, (stam. fl), A.M. Bang 2048 (HOLOTYPE: NY).

*Cybianthus egensis* Mez in Engl., Pflanzenr. IV, 236(Heft 9):222. 1902. syn. nov. TYPE: BRAZIL. AMAZONAS: Near Ega [Teffe], Sep 1831 (stam. fl), E. Poeppig 2567 (HOLOTYPE: W, F Neg. 31997; ISOTYPE: W).

*Cybianthus brownii* Gleason, Bull. Torrey Bot. Club 53:293. 1926. syn. nov. TYPE: GUYANA [BRITISH GUIANA]. Tumatumari, 18 Jun–8 Jul 1921 (stam. fl), H. Gleason 159 (HOLOTYPE: NY; ISOTYPE: K).

*Tree to 5 m tall. Branchlets angulate, (2.5–)3.5–5 mm diam., densely rufous tomentose. Leaves pseudoverticillate; blades chartaceous, oblanceolate to elliptic, (10–)17–27(–34) cm long, (3–)6–9(–11) cm wide, apically acute to acuminate, basally acute, slightly decurrent on the petiole, midrib slightly*

raised above, prominently raised below, the secondary veins 10–13 pairs, rufous puberulent and smooth above, glabrescent, sparsely rufous puberulent below, concentrated along the midrib and secondary veins, inconspicuously pellucid punctate, the margin flat, entire; petioles slightly canaliculate, (15–) 20–25(–30) mm long, tapered, densely and minutely stellate rufous stellate puberulent. *Staminate inflorescence*: an erect, simple raceme, (7.5–)10.5–18(–23) cm long, sparsely rufous stellate puberulent; peduncle 1–3 cm long; floral bracts coriaceous, lanceolate, 0.5–0.7 mm long, 0.2–0.3 mm wide, apically subulate, densely rufous stellate puberulent, the margin entire; pedicels cylindrical, 2.1–2.7 mm long, sparsely rufous stellate puberulent, glabrescent. *Staminate flowers* 4-merous, carnose, nodding, green; calyx cotyliform, 0.9–1.1 mm long, the tube ca. 0.1 mm long, the lobes widely ovate, 0.8–1 mm long, 0.9–1 mm wide, apically rounded, densely rufous stellate puberulent, sparsely and prominently black punctate, the margin opaque, coarsely serrulate, densely glandular-ciliolate; corolla carnose, subrotate, 1.6–1.8 mm long, the tube quadrate, 0.5–0.6 mm long, glabrous, the lobes widely triangular, 1.1–1.3 mm long, 1.5–1.7 mm wide, reflexed in anthesis, apically acute, dorsally recurved, prominently and densely black punctate and glabrous without, densely glandular granulose throughout within, the margin slightly revolute, densely glandular-granulose; staminal tube inconspicuous, hyaline, membranous, 0.5–0.6 mm long, adnate to corolla tube, anthers apparently sessile, cuadrata, 0.3–0.4 mm long, 0.5–0.6 mm wide, apically truncate, basally truncate, leaning proximally at anthesis, the connective prominently punctate dorsally, rufous glandular-papillate apically; pistillode obsolete or conical, 0.4–0.5 mm long, 0.1–0.2 mm wide, hollow, glabrous. *Pistillate inflorescence* as in staminate but (4.5–)8.5–10(–13) cm long; peduncle 1–2.5 cm long; floral bracts 0.5–0.7 mm long, 0.2–0.3 mm wide; pedicels 0.9–1.2 mm long. *Pistillate flowers* as in staminate but calyx 0.8–1.2 mm long, the tube ca. 0.2 mm long, the lobes 0.6–0.8 mm long, 0.9–1.1 mm wide; corolla 1.2–1.4 mm long, the tube 0.4–0.5 mm long, the lobes 0.7–0.9 mm long, 1.1–1.2 mm wide; staminodial as in staminal tube, 0.4–0.5 mm long, adnate to corolla tube, the antherodes 0.2–0.3 mm long, 0.4–0.5 mm wide; pistil obturbinate, 0.5–0.6 mm long, 0.3–0.4 mm wide, glabrous, the ovules 2–3, partially imbedded in the placenta. *Fruit* globose, 5–7(–9) mm diam., black at maturity, the exocarp thick, juicy.

*Distribution*.—In moist forests rimming the Amazon Basin, from Guyana through Venezuela to the Andes of Colombia southward to Bolivia, 100–1,000(–2,000) m. It is also known from the Chocó Floristic Province of Colombia, and may be expected in that corresponding region of Ecuador. The Bolivian specimens cited below represent new distribution records.

*Ecology and conservation status*.—*Cybianthus venezuelanus* is common in lowland and premontane moist forests, and occasionally in premontane pluvial for-

ests. It is locally common and appears to do well in light gaps and forest margins, thus, it should not be considered threatened.

*Etymology.*—The epithet refers to the country from which the type was collected, Venezuela.

Representative specimens examined. ECUADOR. Zamora-Chinchipe: Nangarita Cantón, Pachicutzá, Camino al Hiro, Cordillera del Cóndor,  $04^{\circ} 07' S$ ,  $78^{\circ} 37' W$ , 1,000–1,100 m, 19 Oct 1991 (fr), W. Palacios et al. 8313 (BRIT, MO, QCNE). PERU. Huánuco: Prov. Leoncio Prado, Dtto. Rupa Rupa, Ynti, Rd. to Río Rondos, 750 m, 24 Mar 1972 (stam. fl), J. Schunke 5308 (AMAZ, F, G, MO, NY, US, USM). Loreto: Prov Maynas, Mishuyacu, near Iquitos, 100 m, Oct–Nov 1929 (stam. fl), G. Klug 94 (F, NY, US); Peña Negra, near Iquitos, 100 m, 20 Oct 1979 (bud), F. Ayala 2102 (AMAZ, MO, USM); Quebrada Orejón, Purma, 29 Oct 1980 (fr), F. Ayala et al. 2814 (AMAZ, MO, US, USM); Pumayacu, between Balsapuerto and Moyobamba, 600–1,200 m, Aug–Sep 1933 (stam. fl), G. Klug 3188 (F, G, MO, NY, S, US). Madre de Dios: Prov. Tambopata, Tambopata Wildlife Reserve, 30 km S of Puerto Maldonado,  $12^{\circ} 15' S$ ,  $69^{\circ} 17' W$ , 260 m, 14 Nov 1984 (stam. fl), H. Young et al. 179 (MO, US, USM); Tambopata Tourist Camp at junction of Ríos Tambopata and La Torre,  $12^{\circ} 49' S$ ,  $69^{\circ} 43' W$ , 280 m, 22 Jul 1985 (ster.), A. Gentry et al. 51083 (CUZ, MO, USM), 27 Jul 1985 (ster.), A. Gentry et al. 51400 (CUZ, MO, US, USM). BOLIVIA. Santa Cruz: Prov. Florida, Parque Nacional Amboro, Sta. Rosa de Lima, 5–8 km N of Cerca a La Cumbre, on path to La Playa,  $17^{\circ} 49.5' S$ ,  $64^{\circ} 16' W$ , 2,000–2,100 m, 3–5 May 1993 (fr), I. Vargas et al. 2248 (BRIT, MO, USZ).

The perianth of the lectotype of *Cybianthus venezuelanus*, with dense and prominent black punctations, the truncate sessile anthers, large oblanceolate chartaceous leaves, and short pedicels match the collections cited here. *Cybianthus venezuelanus*, as treated here, is a polymorphic ochlospecies with many regional variants. The type of *Cybianthus brownii* Gleason varies only in its shorter pedicels and longer corolla lobes. Likewise, the type of *Cybianthus egenensis* Mez, in bud, has correspondingly shorter pedicels and corollas. *Cybianthus venezuelanus* is easily recognized by the angulate branchlets, pseudoverticillate leaves, rounded calyx lobes with opaque margins, and truncate anthers with confluent pores. Its distribution, which rims the Amazon Basin, is unusual in the Myrsinaceae but is common in other families, such as the Piperaceae (R. Callejas, pers. comm.).

37. *Cybianthus grandezii* Pipoly, sp. nov. (Fig. 26). TYPE: PERU. LORETO: Prov. Maynas, Quebrada Yanayacu, entering from Aucayo, 25 Aug 1990 (stam. fl), C. Grández, S. Vásquez & M. Flores 1824 (HOLOTYPE: MO; ISOTYPES: AMAZ, US).

Quoad folia magna chartacea nervos secundarios tertiariorisque laminares praeclare utrinque conspicua ad bases gradatim descrescentiaque necnon petiolos pulvinatos *C. jenisonii* valde affinis sed ab ea laminis ad bases obtusis auriculatisque (non cuneatis) manifeste desuper perpuncticulosis (nec epunctatis) desuper nitidus (nec sordidis) nerviis secundariis 18–24 (non 24–30)-jugis, 12–13.5 (non 6.5–9) cm latis, petiolis 0.5–1.4 (non 2.1–5) cm longis, pedicellis 0.3–0.5 (non 0.8–1.4) mm longis, bracteis florinis pedicellis 3 (non 6–7)-plo longiores statim cognoscitur.

*Shrub* to 2 m tall. *Branchlets* terete, ca. 10 mm diam., rufous-lepidote.

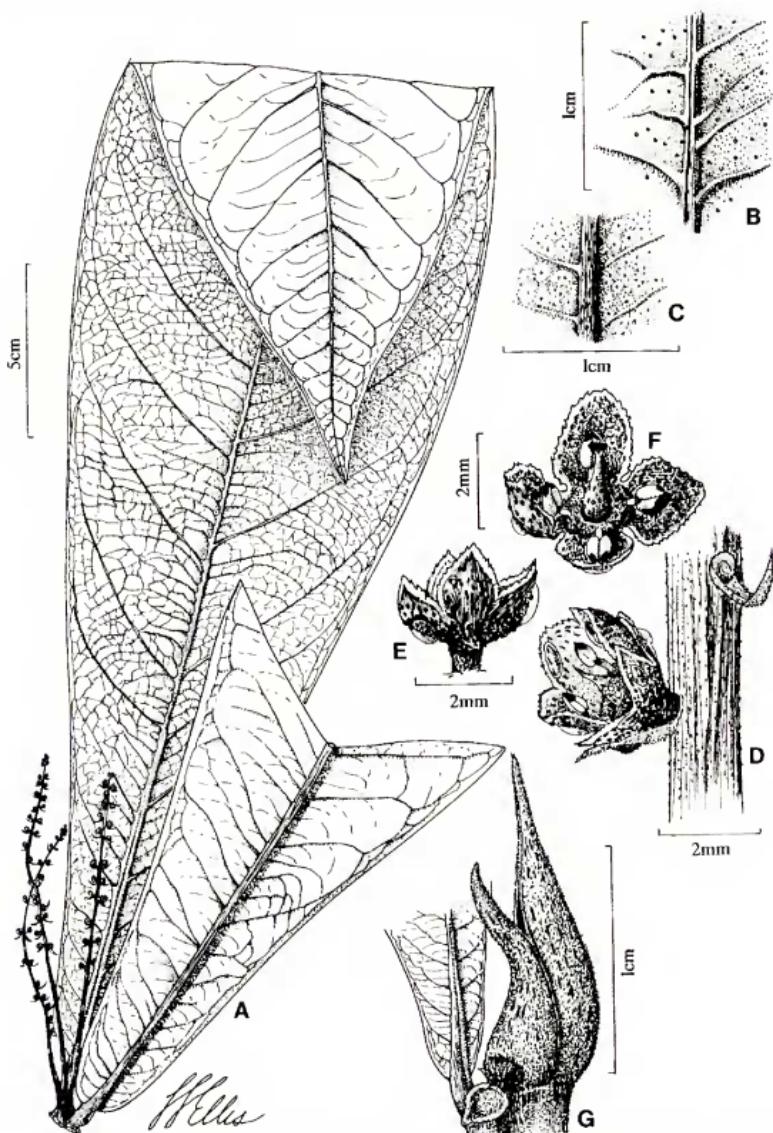


FIG. 26. *Cybianthus grandezi* Pipoly. A. Habit, showing basally truncate and somewhat auriculate leaf bases. B. Adaxial, prominently perpuncticulose surface. C. Abaxial, minutely rufous lepidote surface. D. Portion of inflorescence. E. Pistillate calyx, showing pustulate, black punctate lobes with hyaline, erose-serrulate margins. F. Pistillate corolla, showing pustulate abaxial surface. G. Branchlet apex. A–G, drawn from holotype by Linda Ellis.

Leaves alternate; blades chartaceous, oblanceolate, 34–36 cm long, 12–13.2 cm wide, apically sub acuminate, basally truncate and appearing auriculate, nitid above, pallid below, glabrous, and prominently black perpuncticulose above, sparsely and minutely rufous-lepidote below, the midrib raised and canaliculate above, prominently raised, black punctate-lineate and densely rufous-lepidote below, the secondary veins 18–24 pairs, loop-connected submarginally, the margin entire; petioles canaliculate, (0.5–)1–1.4 mm long, 0.4–0.6 mm diam., pulvinate, densely lepidote. *Staminate inflorescence* unknown. *Pistillate inflorescence* an erect, straight simple raceme, (8.5–)11–14 cm long; peduncle 1–3 cm long; the rachis green, densely red glandular-papillate, black punctate-lineate; floral bracts membranaceous, linear-lanceolate, 1.8–2 mm long, densely rufous lepidote; pedicels obconic, 0.5–1 mm long, densely glandular-papillate. *Pistillate flowers* chartaceous, creamish-white; calyx cotyliform, 1.8–2 mm long, the tube ca. 0.5 mm long, the lobes widely ovate, 1.3–1.5 mm long, 1.1–1.2 mm wide, apically acute, densely and prominently black punctate, prominently translucent pustulate, the margin hyaline, irregular, erose-serrulate, epunctate, glabrous; corolla subrotate, 2.2–2.4 mm long, the tube ca. 0.5 mm long, the lobes very widely ovate 1.7–1.9 mm long and wide, apically rounded, densely and prominently black punctate and translucent pustulate without, glandular-granulose throughout and prominently black punctate within, the margin hyaline, epunctate, minutely erose-crenulate, glabrous; staminodes 1.1–1.2 mm long, staminal tube conspicuous, carnose, 0.4–0.5 mm long, elobate, densely glandular-papillate, the filaments terete, proximally curved, 0.2–0.3 mm long, the sterile anthers ovate, 0.5–0.6 mm long, and wide, the apically apiculate, dehiscent by terminal confluent pores ca. 3/4 length, the connective prominently black punctate; pistil obturbinate, 1.5–1.6 mm long, 0.5–0.6 mm diam., densely and prominently black punctate, translucent glandular-lepidote, the ovary 0.5–0.6 mm long, the style 0.8–0.9 mm long, the stigma bilobed, the lobes to 0.1 mm long, distally curved, the placenta subglobose, with 2–4 ovules partially embedded. *Fruit* globose, 8–10 mm long and in diam., the exocarp thick, juicy, purple-black at maturity.

*Distribution.*—Known only from Maynas Province, Dept. of Loreto, Peru, at up to 125 m elevation; presumably endemic.

*Ecology and conservation status.*—*Cybianthus grandezi* is restricted to primary lowland most upland *terra firme* forest over red lateritic clays. Label data indicate it is rare, and given the valuable timber present in that forest type, this species should be considered threatened.

*Etymology.*—It is indeed a pleasure to dedicate this species to Biól. César Grandezi, professor of biology at the Universidad Nacional de la Amazonía Peruana (UNAP), Iquitos, and authority on the systematics of Peruvian Flacourtiaceae. César is an ardent field worker, an excellent teacher and herbarium curator.

PARATYPE: PERU. Loreto: Prov. Maynas, Dtto. Fernando Lores, Panguana, 125 m, 6 Aug 1991 (fr), S. McDaniel & M. Rimachi 31219 (MO, IBE).

*Cybianthus grandezii* is closely related to *C. jensonii* Pipoly, but is easily recognized by its subsessile leaves with truncate bases. The perpuncticulose and nitid adaxial leaf surface, and secondary veins raised prominently above and below are also distinctive.

38. *Cybianthus jensonii* Pipoly, sp. nov. (Fig. 27). TYPE: PERU. LORETO: PROV. Alto Amazonas: Andoas, Río Pastaza near Ecuadorian border, 02° 48' S, 76° 28' W, 210 m, 14 Aug 1980 (fr), A. Gentry, R. Vásquez & N. Jaramillo 29700 (HOLOTYPE: MO; ISOTYPES: AMAZ, NY, USM).

Quoad folia magna chartacea nervos laminares secundarios tertiariosque paeclate utrinque conspicua ad bases gradatim aqdescrescentia petiolosque pulvinatos *C. grandezi* valde affinis sed ab ea laminis ad bases cuneatis (nec obtusis auricularisque) epunctatis (non manifeste desuper perpuncrulosis) desuper sordidis (non nitidis) nerviis secundariis 24–30 (non 18–24)–jugis, 6.5–9 (nec 12–13.5) cm latis, petiolis 2.1–5 (non 0.5–1.4) cm longis, pedicellis 0.8–1.4 (non 0.3–0.5) mm longis bracteis florinis pedicellis 6–7 (non 3)–plo longiores statim cognoscitur.

*Treelite* to 4 m tall. *Branchlets* terete, 7–9 mm diam., lenticellate, the bark vertically ridged, densely rufous tomentose. *Leaves* alternate; blades membranaceous, oblanceolate, 33–49 cm long, 6.5–9 cm wide, apically subacuminate, basally long-attenuate, dull green above and below, the veins 24–30 pairs, bullate above, prominently raised below, the tertiary areoles prominently raised below; glabrate above, moderately rubiginous fufuraceous lepidote and sparsely pellicid punctate below, the margin entire, decurrent, gradually tapering to the petiole; petioles marginate, 2.1–5 cm long, to 0.5 cm thick, glabrous, abruptly pulvinate, the pulvinus 1.3–2 cm above petiole base. *Staminate inflorescence*: a simple, lax, axillary raceme 6.5–8 cm in bud; the rachis, bracts and pedicels densely rufous tomentose; floral bracts membranaceous, linear-lanceolate, 3–4 mm long, 0.3–0.4 mm wide, apically subulate, the margin entire; pedicels cylindrical, 0.8–1.4 mm long, glabrescent. *Staminate flowers* 4-merous; calyx membranaceous, cotyliform, 1.4–1.6 mm long, the tube 0.2–0.4 mm long, the lobes widely ovate, 1–1.3 mm long, 1.2–1.5 mm wide, apically acuminate, densely and prominently black punctate, sparsely rufous pubescent, the margin hyaline, flat, erose, epunctate; corolla (in bud) subrotate, membranaceous, to 1.2–1.5 mm long, the lobes ovate, apically obtuse, densely and prominently black punctate, glabrous without, sparsely glandular-granulose within, the margin hyaline, flat, erose, epunctate, glabrous; stamens appearing epipetalous, the anthers sessile at the junction of corolla tube and lobe, deltoid, ca. 0.7 mm long and wide, dehiscent by subapical pores, the connectives red punctate medially; pistillode, conic, hollow, ca. 0.5 mm long and 0.2 mm diam. *Pistillate inflorescence* as in staminate but 3–6(–7.2) cm long; floral bracts 1–1.6 mm long, 0.2–0.4 mm wide, apically long-attenuate; fruiting pedicels incrassate, 0.7–0.9 mm long, to 1.5 mm

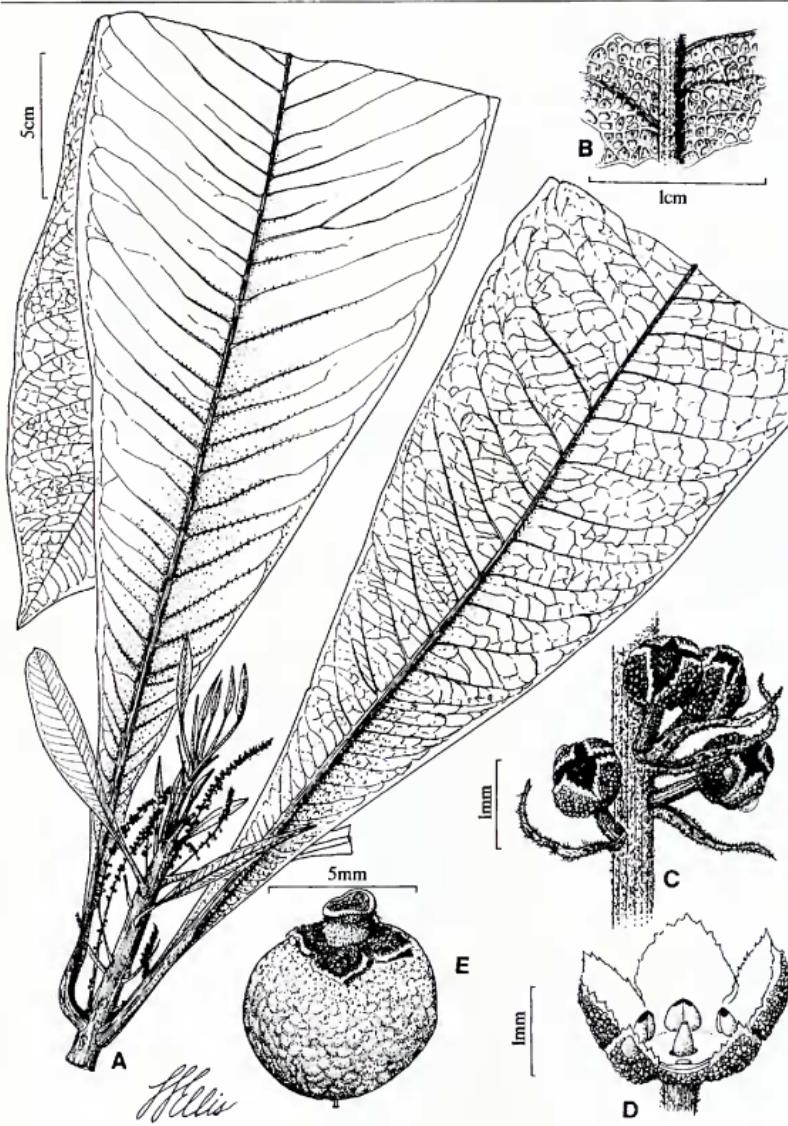


FIG. 27. *Cybianthus jessonii* Pipoly. A. Habit, showing long-attenuate leaf bases. B. Abaxial leaf surface with prominently defined areoles. C. Portion of staminate inflorescence in bud. D. Open staminate bud. E. Pedicel, calyx and fruit. A-D, drawn from Gentry et al. 55708. E, drawn from Croat 19485. Figure drawn by Linda Ellis.

diam. *Pistillate flowers* as in staminate, calyx 1.4–1.6 mm long, the tube 0.2–0.4 mm long, the lobes 1–1.3 mm long, 1.2–1.5 mm wide; corolla, staminodes and pistil unknown. *Fruit* depressed-globose, orange, 5–6 mm long, 6–7 mm diam., smooth, prominently pellucid punctate.

*Distribution.*—Endemic to lateritic slopes above riparian areas in the Department of Loreto, Provinces of Alto Amazonas and Maynas, in the northern Amazon Basin of Peru, 130–210 m.

*Ecology and conservation status.*—This species occurs in primary lowland tropical várzea forest margin. It is surely a rare species, given the recent massive collection effort at the sites during the *Florula of the Biological Reserves of Iquitos* project (Vásquez 1997), during which the species was not relocated at the Explorama Inn (Indiana) site. Given its rarity, this species should be considered threatened.

*Etymology.*—I dedicate this species to Peter Jenson, President of Explorama Tours, conservationist and principal promoter of ecotourism in the Peruvian Amazon. Much of our knowledge regarding the biology of tropical ecosystems in the Peruvian Amazon would not have been discovered were it not for Peter and his associates' enthusiastic support, generosity and hospitality at the company's biological reserves (Explorama Inn, Explorama Lodge, and Explornapo Camp) which now serve as long-term ecological study sites. Explorama Tours' properties, with their combination of research, public education and collaboration with local communities and tourism, serves as the most successful model for tropical ecotourism known.

*PARATYPES.* PERU. Loreto: Prov. Maynas, Explorama Inn, 2 km W of Indiana on Río Amazonas, 03° 30' S, 73° 02' W, 130 m, 12 Feb 1987 (stam. bud), A. Gentry et al. 55708 (AMAZ, MO); Varadero de Mazán from Río Amazonas to Río Napo, 22 Aug 1972 (fr), T. Croat 19485 (AMAZ, MO, NY, USM).

*Cybianthus jenonii* is most closely related to *C. grandezi* Pipoly, but easily recognized by its long-attenuate leaf bases, epunctate, pallid abaxial leaf surfaces, the secondary veins 24–30 pairs, narrower leaves with much longer petioles, subobsolete pedicels 0.8–1.4 mm long, and longer floral bracts.

39. *Cybianthus fosteri* Pipoly, sp. nov. (Fig. 28). TYPE: PERU. MADRE DE DIOS: Prov. Manú, Atalaya, vicinity Hacienda Amazonia, 2–3 km W of village, across Río Alto Madre, 12° 55' S, 71° 12' W, forested ridge, 600–900 m, 7 Dec 1983 (stam. fl), R. Foster & T. Wachter 7254 (HOLOTYPE: MO; ISOTYPES: F, NY, USM).

Ob folia pseudoverticillata magna chartacea longipetiolata abrupte acuminataque, inflorescentia longiracemosa, flores nutantes, coriaceosque, antheras sessiles manifeste necnon dorso punctatas, *C. venezuelano* valde affinis sed ab ea ramulis teretes (non angulatis), foliis pseudoverticillatis (non alternis), laminis denseque manifeste atro-punctatis et omnino prominens (non parceque plane subter atro lineato-punctatis) petiolatis canaliculatis (non marginatis ad bases abrupte crassis (nec gracilis) lobis corollinis interius pustulatis (non planis), antheris ad apices rotundatis (non truncatis) poris separatis (non confluentibus) praecclare distat.

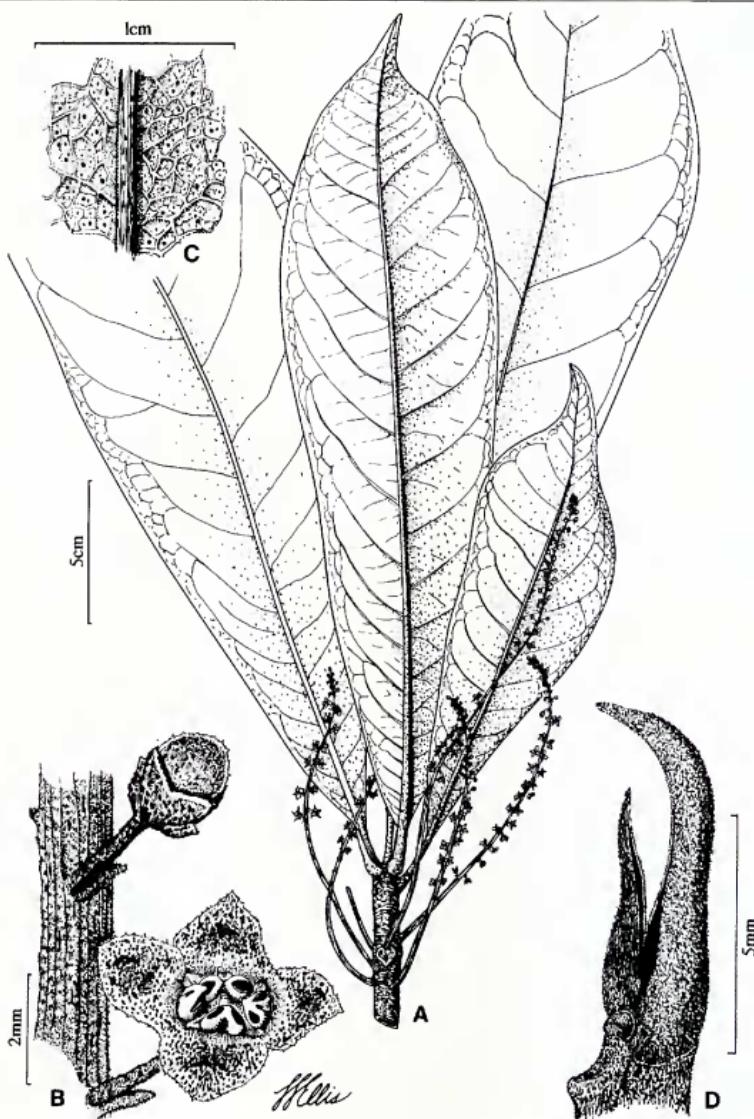


FIG. 28. *Cybianthus fosteri* Pipoly. A. Habit, showing terete branchlets and pseudoverticillate phyllotaxy. B. Portion of staminate inflorescence, showing pustulate corolla and apically rounded anthers with separate (not birimose) pores. C. Abaxial leaf surface detail, showing punctations and sparse puberulence. D. Branchlet apex, showing tomentum. A–D, drawn from holotype, by Linda Ellis.

*Tree to 5 m tall. Branchlets terete, (6–)7–9 mm diam., densely ferrugineous tomentose. Leaves pseudoverticillate; blades chartaceous, oblanceolate, (26–)28–34 cm long, 5.5–9(–10) cm wide, apically abruptly acuminate, basally long attenuate, midrib somewhat elevated above, prominently raised below, the secondary veins 11–18 pairs, dull green above, pallid below, prominently black punctate above and below, sparsely rufous puberulent below, the margin entire, regular, flat; petioles canaliculate, 1.6–2 cm, pulvinate, ferrugineous tomentose, glabrescent. Staminate inflorescence a lax raceme 8–12 cm long, moderately rufous lepidote, glabrescent; floral bracts lanceolate, 2–3 mm long, 0.8–1.1 mm wide, apically acute, densely rufous lepidote; pedicels cylindrical, 3.5–5 mm long at anthesis erect in bud, nodding in anthesis, densely rufous lepidote. Staminate flowers 4-merous, coriaceous, nodding, pale green; calyx cotyliform, 1.2–1.3 mm long, the tube 0.5–0.6 mm long, the lobes widely ovate, 0.7–0.8 mm long, 1.1–1.2 mm wide, apically rounded, densely and prominently black punctate, sparsely rufous lepidote, glabrescent, the margin stramineous, opaque, epunctate, erose-fimbriate, glabrous; corolla subrotate, 2–2.5 mm long, the tube 0.5–0.6 mm long, glabrous, the lobes widely ovate, 2–2.1 mm long, 1.4–1.6 mm wide, apically acute, densely and prominently black punctate, sparsely rufous lepidote without, glabrescent, prominently pustulate and densely glandular-granulose throughout within, the margin stramineous, erose, glandular-granulose; stamens apparently sessile at junction of corolla lobes and tube, the anthers sessile, very widely ovate, 0.5–0.6 mm long, 0.8–0.9 mm wide, apically rounded, basally truncate, the pores widely ovate, extending 1/2–3/4 anther length, separate (not confluent), the connective prominently red punctate; pistillode subglobose, 0.7–0.8 mm long, 0.3–0.4 mm wide, hollow, densely glandular-lepidote. Pistillate inflorescence as in staminate but erect, 3–5 cm long; floral bracts 2–3 mm long, 0.8–1.1 mm wide; pedicels 2.5–4 mm long in fruit. Pistillate flowers as in staminate but calyx 0.8–1 mm long, the tube 0.2–0.3 mm long, the lobes 0.5–0.7 mm long, 0.9–1.1 mm wide; corolla, staminodes and pistil unknown. Fruit globose, 6–8 mm long and diam., red at maturity.*

*Distribution.*—Known only from the type locality, presumably endemic.

*Ecology and conservation status.*—*Cybianthus fosteri* is endemic to one area of the Manú Biosphere Reserve and National Park, one of the largest in South America. It is a ridgetop species in lowland topical moist forest. Given the extension of the Reserve and the species narrow range, it should not be considered threatened at this time.

*Etymology.*—This species is dedicated to Robin Foster, of the Smithsonian Tropical Research Institute and a research associate of the Field Museum of Natural History. Robin has served as one of the co-founders of the Rapid Assessment Protocol, and is an expert on the reproductive biology of *Tachigali* (including *Sclerolobium*) of the Fabaceae.

PARATYPE: PERU. Madre de Dios: Prov. Manú, Atalaya, vicinity Hacienda Amazonia, 2–3 km W of village, across Río Alto Madre,  $12^{\circ} 55' S$ ,  $71^{\circ} 12' W$ , 600–900 m, 7 Dec 1983 (fr), R. Foster & T. Wachter 7242 (BRIT, F, MO, NY, USM).

*Cybianthus fosteri* is closely related to *Cybianthus venezuelanus*, but is easily recognized by its terete branchlets, pseudoverticillate leaves prominently and densely black punctate above and below, canaliculate petioles, pustulate corolla lobes, and rounded anthers with separate (not birimose) pores. The pustulate corolla lobes are unique within the genus.

40. *Cybianthus resinosus* Mez in Engl., Pflanzenr. IV. 236(Heft 9):219.

1902. TYPE: PERU. LORETO: Prov. Maynas, near Yurimaguas, without date (fr), E. Poeppig 2428 (HOLOTYPE: W; ISOTYPE: P).

Tree to 15 m tall. Branchlets 2.5–3.5 mm diam., densely ferrugineous dendroid-tomentose at first, glabrescent. Leaves pseudoverticillate; blades thinly coriaceous, elliptic, (11–)15–21(–26) cm long, (4–)5.5–7(–10.8) cm wide, apically long-acuminate, the acumen 0.8–1.5(–2) cm long, basally cuneate, decurrent on the petiole, midrib prominently elevated above and below, decurrent to petiole base, the secondary veins (9–)11–16(–18) pairs, nitid and glabrous above and below, inconspicuously pellucid-punctate (not visible when dried), the margin entire, irregular, flat, entire; petioles canaliculate, 1–2(–3) cm long, tapered, densely ferrugineous dendroid-tomentose, glabrescent. Staminate inflorescence a lax, simple raceme, 11–15 cm long, sparsely rufous stellate puberulent; peduncle 0.9–1(–1.8) cm long; floral bracts chartaceous, linear, 1–1.2 mm long, 0.2–0.3 mm wide, apically subulate, densely rufous stellate puberulent above and below, the margin entire, early caducous; pedicels cylindrical, 2.1–1.7 mm long, sparsely puberulent, glabrescent. Staminate flowers 4-merous, membranaceous, nodding, greyish-brown; calyx cotyliform, 0.9–1 mm long, the tube 0.1–0.2 mm long, the lobes widely ovate, 0.6–0.8 mm long, 0.9–1.2 mm wide, apically acuminate, sparsely rufous stellate puberulent, densely and prominently black punctate, the margin hyaline, erose, short glandular-ciliate; corolla subrotundate, translucent, 1.6–1.8 mm long, the tube cylindrical, 0.3–0.5 mm long, the lobes very widely ovate, 1.2–1.5 mm long, 1.5–1.8 mm wide, flat, apically obtuse, densely and prominently black punctate and glabrous without, densely glandular-granulose and pusticulate within, the margin irregular, glandular-granulose, entire; stamens 0.7–0.9 mm long, the tube inconspicuous, membranaceous, 0.3–0.5 mm long, sessile, the anthers quadrate, 0.2–0.3 mm long, 0.5–0.6 mm wide, apically truncate, translucent, glabrous, the connective prominently red punctate dorsally; pistillode cylindrical, 0.3–0.5 mm long, 0.2–0.3 mm diam., hollow, densely punctate, glabrous, the stigma 3-lobed. Pistillate inflorescence as in staminate but (1–)1.5–5 cm long; peduncle (0.3–)0.5–1(–1.5) cm long; floral bracts 0.6–1 mm long, 0.1–0.2 mm wide; pedicels slightly

obconical, 0.7–1.1 mm long, erect in fruit. *Pistillate flowers* as in staminate but 1–1.2 mm long, the tube 0.2–0.3 mm long, the lobes 0.8–0.9 mm long, 1–1.2 mm wide; corolla 1.3–1.5 mm long, the tube 0.3–0.5 mm long, the lobes 0.8–1 mm long, 1.1–1.5 mm wide; staminodes as in stamens but 0.4–0.6 mm long, the tube 0.3–0.5 mm long, the antherodes ca. 0.1 mm long, 0.2–0.3 mm wide; pistil obturbinate, 0.4–0.6 mm long, and in diameter, the style very short, the stigma 3-lobed, the placenta cotyliform, bearing 2 apically exposed ovules. *Fruit* globose, 5–7 mm diam. at maturity, exocarp black, juicy, edible at maturity. *Bisexual inflorescence* as in pistillate but a lax, simple raceme, or rarely a poorly formed panicle, 5–8(–10) cm long; peduncle 0.5–1 cm long; floral bracts 1–1.2 mm long, 0.2–0.3 mm wide; pedicels 1.2–1.5 mm long. *Bisexual flowers* as in pistillate, but stamens as in staminate, 0.5–0.8 mm long, the tube 0.2–0.3 mm long, the anthers ca. 0.3–0.5 mm long, 0.4–0.5 mm wide; pistil as in pistillate, conical, 0.4–0.6 mm long, and in diam. *Bisexual fruit* globose, 4–6 mm diam. at maturity, exocarp reddish-black, thin.

*Distribution.*—Once thought to be endemic to the Iquitos area of Loreto, Peru, *Cybianthus resinosus* is now known (reported for the first time here), from the Chocó of Colombia, Amazonian Ecuador, Venezuela, with one disjunct population in French Guiana (*Oldeman* 3272) growing at 100–200(–1,300) m elevation.

*Ecology and conservation status.*—*Cybianthus resinosus* is restricted to primary non-inundated forests on white sand (varillal). While it is locally abundant, it should be considered threatened due to increasing habitat loss. The Ecuadorean and Venezuelan populations are unusual because they occur in premontane pluvial forest and wet forest on lower tepui talus slopes (on sandstone) respectively, each containing numerous lowland elements. It may be expected in the Río Cenepa-Río Santiago Drainage Basins, of Amazonas, Peru, an area known to show the same environments with numerous pockets of sandstone.

*Etymology.*—The specific epithet refers to the highly nitid adaxial leaf surface, giving it a lacquered, resinous appearance.

Specimens examined. COLOMBIA. Valle del Cauca: Bajo Calima Concession, ca. 25 km NW of Buenaventura, 9 km NW of San Isidro intersection on "Canalete," near gate, 5–45° slopes, 03° 59' N, 77° 08' W, 50 m, 13 Jul 1988 (ster.), D. Faber-Langendoen & J. Hurtado 1757 (CUVC, MO). VENEZUELA. Territorio Federal Amazonas: Dept. Atabapo, base of cliff and forest below slope of Cerro Huacharnacari, 03° 39' N, 65° 43' W, 1,000–1,300 m, 5 Mar 1985 (stam. fl), R. Liesner 18302 (BRIT, MO, VEN). ECUADOR. Napo: Cantón El Chaco, Río Granadillo, Campamento de INECEL, "Codo Alto," 00° 08' S, 77° 28' W, 1,300 m, 13–15 Sep 1990 (fr), W. Palacios 5589 (MO, QCNE). PERU. Huánuco: Prov. Pachirea, region of Pucallpa, W part of Sirá Mountains and adjacent lowland, ca. 24 km SE to 26 km ESE of Puerto Inca, from Campamento Sirá, 09° 28' S, 74° 47' W, SE to valley of Río Negro, 750 m, 29 May 1988 (fr), B. Wallnöfer 14-29588 (BRIT, MO, W, WU). Loreto: Prov. Maynas, Iquitos, May 1925 (stam. fl), G. Tessmann 5145 (NY); Casería

Mishana, 30 km SW of Iquitos, Callicebus Biological Reserve, 4 km S of Mishana, 19 Aug 1980 (stam. fl), R. Foster 4404 (F-2 sheets, NY); Mishana, 16 Aug. 1978 (pist. fl, fr), J. Ramírez 17 (AMAZ, MO); Mishana, Río Nanay, 03° 50' S, 73° 30' W, 140 m, 16 Aug 1978 (fr), J. Ramírez 132 (AMAZ, MO); Mishana, along Río Nanay, 03° 55' S, 73° 35' W, 150 m, 20 Jan 1985 (fr), R. Vásquez & N. Jaramillo 6126 (AMAZ, MO, NY); Allpahuayo, Estación IIAP, 04° 10' S, 73° 30' W, 150 m, 5 Jun 1985 (bud), R. Vásquez et al. 6551 (AMAZ, BRIT, MO, NY), 29 May 1990 (fr) R. Vásquez et al. 13764 (AMAZ, MO, USM), 16 Aug 1990 (pist. fl, fr), R. Vásquez & N. Jaramillo 14224 (AMAZ, BRIT, F, MO, NY, TEX, US, USM), 4 Dec 1990 (fr), R. Vásquez & N. Jaramillo 15237 (AMAZ, BRIT, F, MO, US, USM), 150–180 m, 29 May 1991 (ster.), R. Vásquez & N. Jaramillo 16681 (AMAZ, BRIT, MO, USM), 150 m, 23 Mar 1992 (ster.), R. Vásquez et al. 17996 (AMAZ, BRIT, MO, USM); Allpahuayo, ca. 26 km along Iquitos-Nauta Rd., 130 m, 25 Aug 1988 (fr), H. van der Werff 10273 (AMAZ, MO); Mishuyacu, near Iquitos, 100 m, Sep 24–28 1929 (fr), E. Killip & A. Smith 29873 (F, US), May–Jun 1930 (bisex. fl), G. Klug 1384 (F, NY, US); Quistococha, 200 m, 27 May 1978 (pist. fl, fr), A. Gentry & N. Jaramillo 22314 (AMAZ, MO); Altura de Piña Negra, SW of Iquitos, ca. 3–4 km past Quisrococha, 200 m, 19 Nov 1975 (fr); Caserío de Urcumiráñ, Río Napo, path from settlement to tall forest, 120 m, 8 Oct 1979 (fr), C. Díaz & N. Jaramillo 1486 (MO, NY); Peña Blanca, on Río Itaya, 110 m, 19 Sep 1929 (fr), E. Killip & A. Smith 29672 (F, US); Between Yurimaguas and Balsapuerto (lower Río Huallaga basin), 135–150 m, 26–31 Aug 1929 (fr) E. Killip & A. Smith 28110 (F, NY, US); Prov. Requena, Dtto. Sapuena, Jenaro Herrera, Río Ucayali, 04° 55' S, 73° 40' W, 160 m, 16 Aug 1994 (stam. fl), R. Ortíz et al. 101 (AMAZ, BRIT, MO); without locality, except "in Peruvia subandina, without date (fr), E. Poeppig s.n. (L).

*Cybianthus resinosis* is most closely related to *C. penduliflorus* Mart., but is easily separated from it by the inconspicuously punctate leaves, longer pedicels, flat corolla lobes and calyx lobes with acuminate apices and erose, short-ciliate margins. The adaxial prominently raised midrib decurrent to the petiole base is unique within the subgenus. The fruit of *Cybianthus resinosis* is also smaller, black and has a thick exocarp, and it inhabits *terra firme* forests on white sand whereas *C. penduliflorus* is an igapó species.

**41. *Cybianthus fuscus* Mart., Flora 259. 1841. TYPE: BRAZIL. MATO GROSSO: "Prope rivum Cochim in Cujaba," May (pist. fl), P. da Silva Manso s.n. (HOLOTYPE: M)**

*Shrub or small tree to 3 m tall. Branchlets terete, 2–3 mm diam., densely dendroid and stellate rufous glandular-tomentose, tardily glabrescent. Leaves pseudoverticillate; blades chartaceous to coriaceous, very narrowly oblanceolate or very narrowly oblong, (13–)16–25(–30) cm long, 2–4(–6) cm wide, apically long acuminate-attenuate, the attenuated portion 1–2 cm long, terminating in a minute rounded tip, basally long acuminate-attenuate, the attenuated portion 1.5–2 cm long, giving the petioles appearance of being longer, fully decurrent on petiole to pulvinus; midrib prominently elevated above, decurrent to petiole base, the secondary veins 12–25 pairs, somewhat to deeply impressed, the leaf appearing subbullose to bullate above, prominently raised and loop-connected below, somewhat nitid and glabrous above, pallid, rufous papillate and conspicuously black punctate and punctate-lineate below, the margin entire, flat, glabrous; petioles somewhat marginate,*

5–10(–12) mm long, with a basal pulvinus. *Staminate inflorescence*: a lax raceme (2.5–)5–8(–19) cm long; peduncle 0.8–1.5 cm long; floral bracts chartaceous, linear, 1.2–1.5 mm long, 0.3 mm wide, apically subulate, densely and prominently rufous papillate; pedicels 3.5–5 mm long, densely papillate. *Staminate flowers* chartaceous, 4-merous; calyx cotyliform, 0.8–1(–1.8) mm long, the tube ca. 0.2 mm long, the lobes very broadly ovate or linear-lanceolate, 0.5–0.8(–1.6) mm long, 0.6–0.8 mm wide, apically acute to acuminate to attenuate, medially thickened, densely and prominently red and black punctate medially, with a few scattered rufous papillae, the margin scarious, highly erose, densely glandular-ciliate; corolla subrotate, 2–2.3 mm long, the tube 0.6–0.8 mm long, the lobes suborbicular, unequally divided, 1.4–1.6 mm long, 1.3–1.7 mm wide, apically broadly rounded, densely and prominently orange punctate without, densely glandular-granulose throughout within, the margin often revolute at maturity, irregular, entire, glandular-granulose; stamens ca. 1 mm long, the filaments developmentally fused to the corolla tube for their entire length (the stamens appearing epipetalous), 0.6–0.8 mm long, the anthers very widely ovate, 0.4–0.5 mm long and wide, the apically acute, basally cordate, apically dehiscent by terminal pores, confluent at anthesis, ventrally sparsely rufous papillate basally, dorsally densely rufous papillate and sparsely but prominently orange punctate; pistillode absent or highly reduced, ca. 0.5 mm long. *Pistillate inflorescence* as in staminate but 3–10(–14) cm long; peduncle 6–10 mm long; pedicels 1.5–4 mm long. *Pistillate flowers* as in staminate but 0.7–0.9 mm long, the tube ca. 0.1 mm long, the lobes oblate, 0.6–0.8 mm long, 1–1.2 mm wide; corolla as in staminate but 1.4–1.8 mm long, the tube ca. 0.5 mm long, the lobes ovate to suborbicular, 1.1–1.7 mm long, 1.0–1.2 mm wide, the staminodes resembling stamens but with antherodes 0.3–0.4 mm long and wide; pistil ellipsoid, 1–1.2 mm long, 0.6–0.8 mm diam., the stigma capitate, 3–4-lobed, densely translucent glandular-lepidote, ovules 2–3, immersed in the placenta. Fruit globose, 5–7 mm long and diam. at maturity, densely and prominently punctate, with a few persistent translucent lepidote scales.

*Distribution*.—As here recognized, *Cybianthus fuscus* occurs from the Guianas, to Venezuela, Colombia, Ecuador, Peru, Bolivia, and their corresponding frontiers with Brazil. *Cybianthus fuscus* rims the Amazon Basin, from 100–200 m elevation. As stated earlier, this is an infrequent distribution, as in *Cybianthus venezuelanus*.

*Ecology and conservation status*.—*Cybianthus fuscus* occurs in primary forest on *terra firme*, especially on steep slopes, near water courses. It is a locally infrequent element of the understory but does not appear to be threatened at this time.

*Etymology*.—The epithet refers to the color of the tomentum of the branchlets, pedicels and calyx.

Representative specimens examined. ECUADOR. Napo: Small area of non-inundated forest, ca. 60 km upriver from Nuevo Rocafuerte, 13 Sep 1977 (fr), R. Foster 3618 (F, USM). PERU. Loreto: Prov. Alto Amazonas, Capahuari Sur (Petroleum Camp), 02° 51' S, 76° 20' W, 200 m, 25 Mar 1982 (fr), R. Vásquez et al. 3065 (AMAZ, MO, US); Prov. Maynas, Río Yavari, Petropolis, 3 km from Río Amazonas, 8 Sep 1976 (fr), J. Revilla 1302 (AMAZ, BRIT, MO); 15 km from roadside along Rd. between UNAP Agricultural Experiment area and Escuela Forestal Vivero, 9 Feb 1968 (pist. fl), D. Simpson & J. Schunke 647 (F, USM); Puerto Almendras, 03° 45' S, 73° 25' W, 122 m, 7 Dec 1982 (pist. fl), R. Vásquez & N. Jaramillo 3511 (AMAZ, MO, NY).

*Cybianthus fuscus* is a widely defined, infrequent, but widely distributed species, and is most variable with regard to leaf size and inflorescence stature. Populations in Ecuador and Peru are almost identical to specimens known from the Guianas, Bolivia, and Brazil in the northeast portion of Amazonas state, near the border of Territorio do Roraima. Populations matching the type have leaves much smaller than the Ecuadorean and Peruvian populations do, and are more like those of the SE Amazon Basin. While Cuiabá is located at the northern extreme of the Pantanal Region, it is not entirely clear where the exact type locality was. If the type locality in what was Cuiabá Province, was north of the Chapada dos Parecis, then it would be at the headwaters of the Rio Juruena or Rio Teles Pires, both of which dump into the Rio Tapajos, then to the Rio Amazonas. If the locality was west of Cuiabá, toward the Bolivian border, streams there form part of the headwaters of the Rio Mamasé, a branch of the Rio Madeiras, which empties into the Amazonas near Manaus. In either case, the type locality would be at the very edge of the Amazon Basin *sensu stricto* and it would not be surprising to see the species in other parts of the Basin. Therefore, while populations from the type locality are slightly smaller in stature, the leaves are more chartaceous, and the inflorescences shorter, there is good evidence to show that they are part of a large polymorphic ochlospecies complex, of which the populations in Ecuador and Peru represent a commonly encountered morphotype. The same pattern of variation seen in this species is seen in many Piperaceae (R. Callejas, pers. comm.).

*Cybianthus fuscus* appears to be closely related to *C. cuneifolius* Mart. (including *C. indecorus* Mez), a vicariant species from SE Brazil. The unique indument, pedicels obconic in fruit, and striking leaves with very long and attenuate apices and bases allow for easy recognition of *Cybianthus fuscus*.

#### 42. *Cybianthus cyclopetalus* Mez, Bull. Herb. Boissier, Ser. 2, 5:533. 1905.

TYPE: BRAZIL. AMAZONAS: near Juruá, Miry, Sep 1903 (stam. fl), E. Ule 5840 (HOLOTYPE: B -destr.; LECTOTYPE, here designated: HBG; ISOLECTOTYPES: G, K, MG).

Shrub to 1.5 m tall. Branchlets terete, 1.5–2.5 mm diam., densely rufous stellate tomentulose, the tomentum appressed. Leaves loosely pseudoverticillate; blades chartaceous, elliptic to oblanceolate, (9.5–)12.5–16(–20.5) cm long,

3.5–5(–7) cm wide, apically subacuminate to acuminate, basally cuneate, decurrent throughout petiole length, midrib depressed above, prominently raised below, decurrent to base of petiole, the secondary veins 10–15 pairs, dull and glabrous above, dull and sparsely rufous puberulent below, concentrated along the midrib and the secondary veins, prominently perpuncticulose and black punctate-lineate, the margin slightly revolute upon drying, irregular, entire; petioles marginate and canaliculate, (1–)1.5–2(–3) cm long, tapered, sparsely stellate rufous puberulent, glabrescent. *Staminate inflorescence* an erect, simple raceme, (4–)9–13 cm long, sparsely rufous stellate puberulent; peduncle (0.6–)0.8–1(–1.3) cm long; floral bracts coriaceous, linear-lanceolate, 1.3–1.5 mm long, 0.2–0.3 mm wide, apically attenuate to a rounded tip, glabrous above, densely and minutely rufous stellate tomentulose below, the margin glabrous, entire; pedicels cylindrical, 3.7–5 mm long, sparsely rufous stellate tomentulose, glabrescent. *Staminate flowers* 4-merous, coriaceous, nodding, green; calyx 0.9–1.1 mm long, the tube 0.2–0.3 mm long, the lobes linear-lanceolate, 0.7–0.8 mm long, 0.2–0.3 mm wide basally, apically long-attenuate, densely and prominently red and black punctate, sparsely rufous stellate puberulent, glabrescent, the margin irregular, erose, minutely ciliolate; corolla subrotate, 1.5–1.8 mm long, the tube 0.6–0.7 mm long, the lobes very widely ovate, 0.9–1.1 mm long, 1.3–1.7 mm wide, apically emarginate, densely and prominently red and black punctate, glabrous without, densely glandular-granulose throughout within, the margin irregular, entire, flat, densely glandular-granulose; staminal tube inconspicuous, adnate to corolla throughout, 0.6–0.7 mm long, the filaments short, thick, 0.1–0.2 mm long, glabrous, the anthers widely ovate, 0.5–0.6 mm long, 0.4–0.5 mm wide, apically and basally truncatae, the connective epunctate, glabrous; pistillode subglobose, 0.3–0.4 mm long, 0.3–0.4 mm diam., hollow, densely translucent glandular-lepidote, the stigma obsolete. *Pistillate inflorescence* as in staminate but 4–6.5 cm long; peduncle 1–1.5 cm long; floral bracts 0.9–1.1 mm long, 0.1–0.2 mm wide; pedicels 1.5–2.5 mm long. *Pistillate flowers* as in staminate but calyx 0.8–1 mm long, the tube 0.1–0.2 mm long, the lobes, 0.7–0.8 mm long, 0.1–0.2 mm wide basally; corolla, staminodes and pistil unknown. *Fruit* globose, 0.3–0.5 mm long and wide, green, exocarp thin, red punctate.

*Distribution.*—*Cybianthus cyclopetalus* is restricted to the western Amazon Basin of Brazil and southeastern Peru, to 290 m elevation.

*Ecology and conservation status.*—This species is restricted to várzea or “tahuampa” habitats, subject to inundation. Rapid development along the rivers in the Amazon Basin changes its flow and may effect these populations. Therefore, it should be considered threatened.

*Etymology.*—The specific epithet refers to the very widely ovate petals of the species.

Representative specimens examined. PERU. Madre de Dios: Prov. Tambopata, Tambopata Wildlife Reserve, 30 km S of Puerto Maldonado, 12° 15' S, 69° 17' W, 260 m, 9 Nov 1984 (stam. fl), H. Young et al. 146 (MO, US); Tambopata Reserve, at mouth of Río Orbigny, 12° 50' S, 69° 17' W, 250 m, 6 Mar 1981 (fr), A. Gentry & K. Young 32028 (MO, USM); Along trail from large laguna at end of Swamp Trail, Explorer's Inn, near confluence of Río Tambopata and Río La Torre, Reserva Tambopata, 12° 50' S, 69° 20' W, 39 km SW of Puerto Maldonado, 14 Oct 1985 (stam. fl), S. Smith et al. 738 (US), (stam. fl), D. Bell 101 (US); Explorer's Inn, Permanent Plots, Tambopata Reserve, 12° 50' S, 69° 17' W, 290 m, 18 Sep 1994 (stam. fl), R. Vásquez et al. 19132 (AMAZ, BRIT, CUZ, MO).

*Cybianthus cyclopetalus* is most closely related to *C. resinosis* Mez, but can immediately be separated from it by the thinner branchlets, dull, chartaceous leaves, and the unique linear-lanceolate calyx lobes with long attenuate apices.

#### 43. *Cybianthus penduliflorus* Mart., Nov. Gen. Sp. Pl. 3:87. 1831 [1829].

*Cybianthus pendulinus* A. DC., Trans. Linn. Soc. London, Bot. 17:104. 1834 [orth. var.].

*Cybianthus penduliflorus* A. DC., Prodr. 8:117. 1844 [orth. var.]. TYPE: BRAZIL AMAZONAS: Prov. Rio Negro, near Ega, 170 m, without date, (stam. fl), C. Martius s.n. (HOLOTYPE: M).

*Cybianthus macrophyllus* Miq. in Mart., Fl. Bras. 10:292. 1856. Pl. 36. syn. nov. *Pecchia macrophylla* (Miq. in Mart.) Kuntze, Revis. Gen. Pl. 2:402. 1891. TYPE: BRAZIL AMAZONAS: Near Ega, without date, (pist. fl), E. Poeppig 2709 (LECTOTYPE, here designated: W).

Shrub or small tree to 4 m tall. Branchlets terete, 2.5–3.5 mm diam., stellate rufous tomentose, glabrescent. Leaves alternate; blades chartaceous, elliptic to oblanceolate, (8–)10.5–19(–28.4) cm long, apically acute, basally broadly acute, slightly decurrent on the petiole, midrib raised above and below, the secondary veins (10–)12–15(–23) pairs, nitid above, pallid below, glabrous, densely black punctate, the margin flat, entire or bearing a few rough serrulations; petioles semiterete, (0.5–)0.8–1.2(–1.5) cm long, tapered, glabrous. Staminate inflorescence a lax, simple raceme (8–)10–14(–20) cm long, densely rufous puberulent; peduncle (0.5–)1–1.2(–1.5) cm long; floral bracts membranaceous, linear-lanceolate, 1–1.2 mm long, 0.1–0.2 mm wide, apically attenuate, densely rufous puberulent, the margin entire; pedicels cylindrical, 1–2(–2.5) mm long, densely rufous puberulent, glabrescent. Staminate flowers 4-merous, erect, membranaceous green; calyx coryliform, 0.8–1.1 mm long, the tube 0.1–0.3 mm long, the lobes ovate, 0.4–0.6 mm long, 0.6–0.9 mm wide, apically obtuse, densely and prominently black punctate, the margin crenulate, long glandular-ciliate; corolla subrotate, 1.2–1.5 mm long, the tube 0.3–0.4 mm long, the lobes very widely ovate, 0.9–1.2 mm long, 1.2–1.5 mm wide, apically obtuse to rounded, densely and prominently black punctate, glabrous without, densely glandular-granulose throughout within, the margin involute, densely glandular-granulose, entire; stamens 0.7–0.9 mm long, the tube completely adnate to corolla tube, 0.3–0.4 mm long, the anthers ovate, 0.4–0.5 mm long, 0.3–0.4 mm wide, apically acute to obtuse, basally cordate, the connective prominently black

punctate dorsally; pistillode obsolete. *Pistillate inflorescence* as in staminate but (2.5)–4–8(–11) cm long; peduncle (0.3)–0.5–1 cm long; floral bracts 1–1.2 mm long, 0.2–0.3 mm wide; pedicels 0.2–0.5 mm long. *Pistillate flowers* as in staminate but calyx 1.2–1.5 mm long, the tube 0.3–0.4 mm long, the lobes widely ovate, 0.9–1.2 mm long, 1.2–1.5 mm wide, apically rounded, corolla and staminodes unknown; pistil conical, 1.2–1.3 mm long, 0.9–1.1 mm wide, the stigma 4-lobed, the placenta cotyloid, ovules 4, naked. *Fruit* 6–10 mm long and in diam., the exocarp thin, densely black punctate. *Bisexual inflorescence*: as in staminate but 6–15 cm long; peduncle 0.8–1.2 cm long; floral bracts 1–1.2 mm long, 0.1–0.2 mm wide; pedicels 1–1.2 mm long. *Bisexual flowers* as in staminate but calyx 0.7–1 mm long, the tube 0.1–0.2 mm long, the lobes 0.6–0.9 mm long, 0.5–0.8 mm wide; corolla 1.2–1.5 mm long, the tube 0.3–0.4 mm long, the lobes very widely ovate, 0.9–1.2 mm long, 1.2–1.5 mm wide, the margin involute, densely glandular-granulose, entire; stamens 0.7–0.9 mm long, the tube completely adnate to corolla tube, 0.3–0.4 mm long, the anthers ovate, 0.3–0.4 mm long, 0.3–0.4 mm wide, apically acute to obtuse, basally cordate, the connective prominently black punctate dorsally; pistil conical, 0.9–1.1 mm long, 0.7–0.9 mm diam., the style 4-lobed, the placenta cotyloid, ovules 3, naked. *Bisexual fruit* globose, 4–6 mm long and in diam., the exocarp thin, pellucid punctate.

*Distribution*.—*Cybianthus penduliflorus* is known from Brazil, Peru and Bolivia, 100–200 m. The species is not known from Ecuador, but may be expected anywhere the habitat is appropriate within the Ecuadorean Amazon.

*Ecology and conservation status*.—*Cybianthus penduliflorus* is endemic to igapó habitats, and withstands flooding. As a small shrub, it grows on riverbanks and on hummocks, behind *Triplaris* (Polygonaceae) and other shoreline plants. At this time, it is not considered threatened.

*Etymology*.—The specific epithet refers to the lax habit of the inflorescence, pendent in the field.

Representative specimens examined. PERU. Loreto: Prov. Maynas, Quistococha, 100 m, 1 Feb 1979 (fr), F. Ayala 1623 (AMAZ, MO), Quistococha, 00° 45' S, 73° 15' W, 122 m, 27 Aug 1987 (stam. fl), R. Vásquez & N. Jaramillo 9461 (AMAZ, MO, USM); Lower Río Momón, tributary of Río Nanay, near Iquitos, 8 Dec 1979 (bud), A. Jones & C. Davidson 9717 (AMAZ, CAS, MO), Near Momoncillo, 16 Nov 1976 (stam. fl), J. Revilla 1826 (AMAZ, F, MO); Dto. Iquitos, caserío near Nina Rumi, on Río Nanay, 23 Feb 1976 (fr), J. Revilla 187 (AMAZ, F, MO, USM); Vicinity of Iquitos, 10 Sep- 12 Oct 1976 (bud), J. Revilla 1442 (AMAZ, BRIT, MO, USM); Morona Cocha, near Iquitos, 100 m, 14 Dec 1962 (fr), J. Schunke 6268 (AMAZ, F, MO, UCLA, US, USM); Puerto Almendras, 03° 48' S, 73° 25' W, 122 m, 17 Aug 1983 (bud), R. Vásquez & N. Jaramillo 4285 (AMAZ, MO, NY, USM); Nauta, Quebrada Saragoza, 04° 29' S, 73° 35' W, 150 m, 10 Jan 1988 (fr), R. Vásquez & N. Jaramillo 10339 (AMAZ, MO, US, USM); Iquitos and vicinity, 11 Oct 1929 (bud), L.L. Williams 3676 (F). BOLIVIA. Santa Cruz: Velasco Prov., Campamento El Refugio, along Río Paragua, SE of the house, 14° 46' 09" S, 61° 02' 11" W, 240 m, 11 Oct 1994 (fl bud),

R. Guillén & G. Salvatierra 2290 (BRIT, MO, USZ); Campamento La Toledo, 1,000 m E of the house, 14° 42' S, 61° 09' W, 160 m, 21 Oct 1994 (stam. fl), R. Guillén & R. Choré 2459 (BRIT, MO, USZ), 1 km W of camp, on canoe route to Campamento Toledo, 14° 45' 51" S, 61° 02' 22" W, 30 Jan 1995 (fr), R. Guillén et al. 3114 (BRIT, MO, USZ).

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#### NUMERICAL LIST OF CYBIANTHUS TAXA

- |   |  |
|---|--|
| 1. <i>Cybianthus pastensis</i>                                | 24. <i>C. pseudolongifolius</i>                  |
| 2. <i>C. gigantophyllus</i>                                   | 25. <i>C. vasquezii</i>                          |
| 3. <i>C. occigranatensis</i>                                  | 26. <i>C. cenebensis</i>                         |
| 4. <i>C. spicigeri</i>  | 27. <i>C. nanayensis</i>                         |
| 5. <i>C. lepidotus</i>  | 28. <i>C. marginatus</i>                         |
| 6. <i>C. laetus</i>   | 29. <i>C. lineatus</i>                           |
| 7. <i>C. peruvianus</i>                                       | 30. <i>C. magnus</i>                             |
| 8. <i>C. comperuvianus</i>                                    | 30a. <i>C. magnus</i> subsp. <i>magnus</i>       |
| 9. <i>C. guyanensis</i> subsp. <i>pseudoicaeocoreus</i>       | 30b. <i>C. magnus</i> subsp. <i>asymmetricus</i> |
| 10. <i>C. timanae</i>   | 31. <i>C. incognitus</i>                         |
| 11. <i>C. cuatrecasasii</i>                                   | 32. <i>C. minuriflorus</i>                       |
| 12. <i>C. nestorii</i>  | 33. <i>C. huampamiensis</i>                      |
| 13. <i>C. spicatus</i>  | 34. <i>C. granulosus</i>                         |
| 14. <i>C. fulvopulverulentus</i> subsp. <i>magnoliifolius</i> | 35. <i>C. flavovirens</i>                        |
| 15. <i>C. verticilloides</i>                                  | 36. <i>C. venezuelanus</i>                       |
| 16. <i>C. croatii</i>   | 37. <i>C. grandezi</i>                           |
| 17. <i>C. humilis</i>   | 38. <i>C. jensonii</i>                           |
| 18. <i>C. sprucei</i>   | 39. <i>C. fosteri</i>                            |
| 19. <i>C. simplex</i>   | 40. <i>C. resinosus</i>                          |
| 20. <i>C. kayapii</i>   | 41. <i>C. fuscus</i>                             |
| 21. <i>C. anthuriophyllus</i>                                 | 42. <i>C. cyclopetalus</i>                       |
| 22. <i>C. schlimii</i>  | 43. <i>C. penduliflorus</i>                      |
| 23. <i>C. poeppigii</i>                                       |  |

## LIST OF EXSICCATAE

Figures in parentheses refer to numbers from the numerical list of taxa. Collection numbers in boldface type indicate type specimens.

Acosta-Solis, M. 5544 (20); Aguilar, M. & D. Castro 623 (7); 655 (7); 805 (9); Albert de Escobar, L. et al. 3744 (16); Álvarez, A. et al. 381 (1); 412 (1); 490 (1); 1330 (1); Ancuash, E. 93 (8); 141 (8); 211 (20); 220 (8); 274 (33); 392 (33); 522 (26); 580 (2); **588** (3); 731 (33); 1405 (20); 1412 (26); 1437 (2); André, E. s.n. (22); 1151 (22); 3819 (17); 4551 (1); Arias, L. et al. 134 (22); Arroyo, L. & K. Keill 164 (8); Arroyo, L. et al. 510 (9); 674 (8); Asplund E. 9396 (20); 10209 (23); Asplund, E. 10302 (23); 12497 (23); 18717 (23); Aulestia, C. & M. 1313 (3); Aulestia, M. & J. Andi 925 (9); Ayala, F. 1623 (43); 2102 (36); Ayala, F. et al. 2814 (36).

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